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The objectives of the institute were (1) to encourage excellence in education research, both institutional (self-study) and action (practice), (2) to have the staff and trainees evaluate the program, and (3) to distribute its findings to junior colleges interested in improving their own research. A followup of the trainees and their research was a subsequent objective. This report fully describes the organization and content of the training program, the daily schedule or activities, the background of the trainees, the methods, instruments, and use of statistics for educational research, the statistical laboratory, and requirements for completion of the institute's course. It lists the guest speakers (with synopses of their talks), site visits, the trainees' tests, and the evaluation instruments. It then analyzes the evaluation of the institute by objectives, content, staffing, trainee characteristics, organization, strengths, weaknesses, and unique features. The report also comments on the USOE's administration of this educational research training program. Eleven appendices give details on all aspects of the program. (HH)

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FINAL REPORT
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A RESEARCH TRAINING INSTITUTE FOR JUNIOR COLLEGE PERSONNEL

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A RESEARCH TRAINING INSTITUTE FOR JUNIOR COLLEGE PERSONNEL

Grant No. OEG 1-6-062027-1411

Project No. 6 2027

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July 11, 1966 - August 19, 1966

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Rockland Community College
State University of New York
Suffern, New York

UNIVERSITY OF CALIF.
LOS ANGELES

AUG 5 1968

CLEARINGHOUSE FOR
JUNIOR COLLEGE
INFORMATION

PREFACE

This Institute represents the joint efforts of many people. The splendid cooperation afforded by Rockland Community College is gratefully acknowledged.

We wish to thank our colleagues in the College for their interest, help and encouragement. We are especially indebted to President Seymour Eskow and to the administrative staff of the College for their assistance in planning this project and for facilitating our work. Dr. Marvin O. Nelson, Chairman of the Psychology Department, helped expedite the work of the project in many ways.

We would like to express our deep appreciation to the staffs of the Educational Testing Service, IBM, Abacus Associates, and McBee-Keysort Systems for sharing their time and facilities so graciously.

The splendid cooperation of John D. Colby, Chief, Research Training Branch, Division of Research Training and Dissemination, was of tremendous help in the success of the Institute.

Finally, may we acknowledge our debt to the eighteen trainees who participated in the Institute. We would like to think that they obtained some benefits from their participation, not the least being the knowledge that they have contributed in some way to the improvement of educational research.

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I - ORIENTATION OF PROGRAM[1]

The Research Training Institute for Junior College Personnel was a six-week summer institute conducted on the campus of the Rockland Community College, State University of New York, from July 11 to August 19, 1966. Sixteen junior colleges located in 7 states in the eastern half of the United States with total enrollments ranging from less than 100 to nearly 4,000 students were represented. Of the total of 18 trainees selected, 14 held teaching positions in a wide variety of disciplines: 2 were librarians, and 2 held administrative positions. Though personal qualifications, educational and experience backgrounds, and recommendations were important factors considered in the selection of these trainees, a major consideration was evidence of their interest in finding solutions to educational problems and of their interest in improvement of their research competence through a program of intensive training in research methodology and statistics.

The significance of this program was set forth in information submitted earlier to the USOE which indicated: (a) the great need for research in junior colleges which have been experiencing unprecedented growth; (b) that, reflecting both a nationwide situation and factors unique to the junior colleges, there was a critical shortage of competent researchers; (c) that much of this needed research, if it is to be done at all, would have to be accomplished by junior college staffs rather than by specialists; (d) that no effort, as far as could then be ascertained, had been directed towards offering an institute for the training of sizeable numbers of the staff of junior colleges[2]; and (e) that there had been no evaluation of the effectiveness of such a training approach for increasing research competency and productivity, professional growth, and institutional effectiveness.

The objectives of the Institute's training program were:

(1) *To encourage, stimulate, and support training of excellence in educational research on the part of the faculty and administrative staff members of junior colleges who have demonstrated an interest in seeking solutions to educational problems.*

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[1] This final report is organized in five major sections: I - Orientation of Program; II - Introduction; III - Description of the Program; IV - Evaluation of the Program; and V - Program Reports.

[2] Two Research Training Institutes were held for junior college personnel at University of California at Berkeley and University of California at Los Angeles July 5-29, 1966, supported by a grant from USOE.

Research training, as conducted in this Institute, encompassed not only the more formal research techniques such as the experimental method, but also included considerable emphasis upon "institutional research" defined as self-study designed to improve the institution and "action research" defined as research undertaken by practitioners to improve their practices. Emphasis was placed in this training program on ways and means of evaluating existing educational practices including the development of evaluation procedures and instruments, and on the recognition of the importance of replication and follow-up studies.

(2) To prepare an evaluatory report upon completion of the program based upon the observations of the training staff and information obtained from the trainees.

This report attempts to evaluate the strengths and weaknesses of the program and includes suggestions for modifications and improvements which might be made if a similar program were conducted again under present auspices or by other junior colleges. Tests, questionnaires, rating forms, "reactionnaires," etc., were administered to the trainees to help systematize and objectify this evaluation.

(3) To disseminate this evaluatory report to other junior colleges interested in improving the quality and quantity of research conducted in their institutions.

A follow-up study of the research activities of the trainees during the ensuing years is also planned. Comparisons will be made with the amount of research activity prior to attendance at the institute. Any compelling evidence of increased interest and participation in research investigations by the trainees and other staff members to an improved climate of opinion toward research, and to recognition afforded individuals engaged in research which could be attributed to the summer training institute will be noted. Such information would also be disseminated.

II - INTRODUCTION

This general introductory section of the report discusses

A. the unprecedented growth and development of junior colleges;

B. the critical need for research in these institutions;

C. the shortage of trained research personnel;

D. possible patterns for the organization and stimulation of competent research in junior colleges; and

E. summary and conclusions.

Following this introduction, sections of the report are devoted to a description and evaluation of the approach used in this institute.

A. Growth and Development of the Junior College.

Today, according to the American Association of Junior Colleges, there are nearly 800 junior and community colleges enrolling more than a million students. In 1900, there were eight such colleges enrolling some 100 students (Gleazer, 1961). Many of these newly established institutions have experienced a tremendous rise in the numbers of students enrolled. Currently, about 20 percent of all college students attend junior colleges. It has been predicted that by 1970, at least 50 percent of all beginning students will start their college years in two-year colleges (Gleazer, 1965).

Clearly, the rapid development of two-year junior colleges offering professional, technical, liberal arts, and general education training is one of the most important features of American higher education.

B. The Need for Research in the Junior Colleges.

Generally, college and university administrators face a period of profound transition and change. The needs for education, especially higher education, are changing dramatically. Pressures are being exerted by the knowledge explosion, financial crises, higher educational expectations of people, soaring enrollments, lack of facilities, shortages of qualified college teachers, disagreements regarding the objectives of higher education, extension of services to the community, etc. To deal with these almost overwhelming problems, administrators must "ask the right questions and then find the right answers." Research findings are indispensable in the areas of policy formulation, planning, program, administration and evaluation of effectiveness (Brumbaugh, 1960). Because the junior colleges are growing more rapidly than any other segment of higher education, in response to changing educational needs, they must continually conduct research to guide their decisions (Merson, 1962).

Johnson (1962) concluded that despite a recently burgeoning interest in institutional research, little has been written about this kind of activity in the junior college. He notes that during the three-year period 1958-1961, the Office of Statistical Information and Research of the American Council on Education in its "Report on Current Institutional Research" included materials from 34 colleges and universities. Only one of these was a junior college.

Some of the findings of a 1962 survey of 100 junior colleges in 13 western states are of interest: (1) more than one-fourth of the colleges reported "no research"; (2) less than one-third of the colleges have been part-time coordinators of research; (3) apparently most two-year colleges give only casual attention to the organization for and conduct of institutional research; (4) although a wide range of problems and subjects were investigated, instruction and methods of teaching were notably neglected; (5) little evidence was assembled regarding use of the findings; and (6) comparatively few faculty members participated in institutional research. Johnson (1962) who made the above survey concluded that "both the quality of research and effectiveness of reporting varies widely from college to college. In all too many colleges, the quality of research is distinctly inferior."

Medsker (1960) arrived at a rather similar conclusion, stating that on the basis of evidence derived from 342 two-year colleges in 15 states, most two-year colleges conduct very little research of the kind that would facilitate institutional planning and an improvement of student personnel services.

Other indications of the lack of significant research studies in junior colleges are found in a review of educational research in these institutions for the five-year period 1960-1965. Fields, Mastin and Walsh (1965) found

1. "unfortunately, relatively little research dealing specifically with the program of instruction"

2. "one of the serious lacks in the development of semi-professional and technical education is careful and considered development of experimental programs and systematic assessment of the results of such programs"

3. Flexibility in undergraduate curriculum, including early admission, honors programs, independent studies, etc., was receiving widespread acceptance in four-year institutions but was only beginning to receive attention in the two-year colleges and "was aimed primarily at the exceptional students" and was "not, as yet, based on thorough research."

Winfrey and Feder (1965) in the same review stated that junior college literature is only beginning to reflect the development of differentiated personnel service programs despite the assumptions that there are important characteristic differences in such programs as contrasted with those of four-year colleges.

Harris (1964) stated that very few research studies are to be found in the literature which provides definitive information for community colleges wanting to initiate or expand technical education programs.

Johnson (1964) concluded after visiting 28 junior colleges in 12 states and information from representatives of 80 different junior colleges:

> "...it is clear that junior colleges, in general, are doing little experimentation in the effective utilization of faculty services. It must be recognized that most of the colleges included in the survey were selected because they were known to engage in some innovating practices, but even among these institutions most of the practices reported were found in a scattering of colleges only."

In a survey of innovating practices found in 95 junior colleges in 14 states (more than one in eight of the 704 listed in the 1963 Junior College Directory), Johnson (1964) made two observations: first, there was comparatively little formal evaluation of new plans; and second, there were, in the strict sense of the term, few actual experiments in the use of faculty services. The developments reported in these "islands of innovation" were for the most part innovating practices used by junior colleges and by no means experiments.

Gleazer (1964), the executive director of the Association of Junior Colleges, stated: "It is my impression that community colleges in general have tended to stay well within the boundaries of current educational practices and procedure. Frequently described as flexible, dynamic, new and responsive, the junior college does not often actually fit that description."

The general picture is thus one of significantly less experimentation, innovation and evaluation than would be expected or certainly hoped for in institutions which are often referred to as the most dynamic unit of American education.

C. The Need for Trained Research Personnel: The General Problem and the Problem in Junior Colleges.

The passage of the Elementary and Secondary Act of 1965 which commits the Office of Education to institute a research training program can be accepted as prima-facie evidence of a general nationwide need for such support. Colby (1965) writing in the American Educational Research Association's Newsletter notes that the need for training in educational research is underscored by the deficiency of identifiable educational researchers. Levin (1965) writing in the same publication, comments that without training programs, the ever-increasing amounts of research funds "would become an albatross to the profession."

Many recommendations for strengthening educational research have been made ranging from organizational arrangements for facilitating the research of faculty members to fundamental changes in the climate of opinion in the various institutions. Lazarsfeld and Sierber (1965) note that their data tend to bear out the observation that a healthy climate for research is, in part, a matter of attitudes of faculty and administrators towards the importance of empirical inquiry. They find that "efforts to improve the skills of current faculty members who are poorly prepared to carry out research, are often frustrated by the faculty's indifference, the lack of time for training in new skills and the difficulty of altering perspectives gained through years of professional work and study."

In line with the above information, it is appropriate to discuss the rather unique nexus of factors found in the junior colleges. Johnson (1962) points out that fiscal limitations imposed by state and county on publicly-supported junior colleges tend against the setting up of elaborate research organizations or even the appointment of a director of research. Heavy teaching loads allow little time for work on research projects. Faculty members may not be immediately sensitive to the need for research, and with recognition being given to effective teaching, research would appear to be largely eliminated as a compensated activity or as offering a major avenue for advancement. Space for "research centers" is in short supply as are qualified persons to direct and carry out research studies. It can be added that extrinsic motivation resulting from a policy of "publish or perish" is largely absent.

The qualifications and pre-service training of junior college faculty also has a direct bearing on any program designed to increase research competency. There seems to be rather clear evidence to account for the shortage of trained personnel as well as gaps and limitations in the training of junior college personnel. Information is available regarding the academic qualifications of the successive groups of new teachers entering full-time service in junior colleges in the biennial N.E.A. Research Division reports. This report summarized by Maul (1965) found that during the eight years of record (1957-58 through 1964-65), teachers who earned the doctor's degree have consistently comprised about 7 percent of the total. Those having completed at least one year of graduate study beyond the master's degree have comprised about 20 percent of the total, and those with the master's degree increased from 44 percent to well above 50 percent. Teachers without the master's degree decreased from more than 28 percent to about 23 percent.

Consistently, throughout the eight years of investigation, according to Maul's findings, the largest single source of new junior college teachers has been the secondary schools with about 3 out of 10 coming from this source. By contrast, large private universities took only 3.7 percent and the large public universities took 5.2 percent from the high schools. While the junior colleges hired 17.1 percent of their new teachers from the senior institutions, the latter recruited only 1.6 percent from junior colleges. It might be hazarded that those shifting from senior to junior institutions were more interested in teaching and students than in research.

Former graduate students accounted for 23.7 percent of the total of new junior college teachers, while senior institutions took as many as 48.9 percent from this source.

As many as 11.3 percent of new junior college faculty members came from business and industry, as contrasted with a range from this source of 11.6 in large private universities to 4.5 percent in the small, private colleges.

In summary, four sources of faculty recruitment for junior college teaching - the secondary schools, graduate schools, college and university staffs, and business and industry - account for almost three-fourths of the total. None of a variety of other sources accounted for more than 4 percent; those coming immediately from the bachelor's degree being the fifth in frequency, with 3.7 percent.

The implications of the above recruitment figures to possible improvement of educational research deserves consideration. Traditionally, the doctorate has signified interest and competence in research. Assuming this holds for junior college faculty at the doctoral level (possibly a questionable assumption), the actual percentage of faculty holding such degrees is absolutely small, and relatively small when compared with the numbers in senior institutions. A recent study of university personnel in the states covered by the North Central Association of Colleges and Secondary Schools revealed a difference of approximately 20 percent in the number of doctoral degree holders in favor of the senior colleges and universities (McCall, Jamrich, Hereford, Friedman, 1961).

With respect to the training received by the largest single source of junior college faculty, it is generally recognized that the faculty of teacher-training institutions are more committed to the practice of teaching than to research and that they give little attention to research methodology in their classes. Most graduate students in education or degree-holders in education have practiced in the schools for several years and have committed themselves to practice rather than to research. Graduate students in education who are interested in research have little opportunity to work with competent researchers during their years of preparation. Many obtain advanced degrees as part-time students. The number of research-orientated course offerings is paltry or is pitched at a low level. Many are not able to engage in research in the first few years of their professional careers and interest may be completely lost or greatly diminished (Clark and Carriker, 1961; Jensen, 1962).

Regarding the faculty recruited from business and industry and those holding just the bachelor's degree, it seems reasonable to assume some limitations or gaps in their training for research, if not in their competency. The same would probably obtain for faculty recruited from such divers and non-educational sources as government service, homemaking, elementary school teaching, military service, school administration, religious service, if not for the scant 1.5 percent described as "research."

D. The Organization and Administration of Research in Junior Colleges.

Mayhew (1962) has suggested a number of approaches that might be adopted by junior colleges for the organization and administration of research. They include the appointment of a full-time director of research; working out arrangements with a qualified research person located in a university to serve as a part-time director; having several community colleges cooperatively employ a director of research who would be part-time on each campus; and a cooperative venture in which each of as many as 60 to 80 colleges contribute to the support of central institutional research services.

Johnson (1962) found in 100 western junior colleges that only 2 percent had full-time coordination, 27 percent had part-time coordination, 43 percent had a "decentralized" organization, and 28 percent had little institutional research. There was no evidence that the size of a college was related to either a centralized or decentralized type of research organization.

Both Johnson and Mayhew agreed regarding the importance of faculty support and participation in research activities. Mayhew believed that "only insofar as institutional research is accepted by the faculty, will its results be respected and used..." Johnson referred in most favorable terms to an apparently unique situation at Stephens College where as early as 1921 where a research consultant encouraged and helped all of the faculty to apply the techniques of research to the study of their particular problems. From 1947-49, for example, 140 projects were carried out, each developed from a persistent unsolved problem, a felt need in the study of which the assistance of the Research Service was elicited.

Jarvie (1956) stressed the responsibility of the administration for a program of instructional improvement by (1) stimulating and aiding faculty members to identify problems and developments on which to work, and (2) helping faculty members develop and carry out plans and procedures for working on problems and projects, including when necessary the assistance of expert consultants.

O'Connor (1965) in his handbook dealing with practical approaches to gathering data and conducting research on factors which influence student accomplishment, emphasizes that in order to convert information derived from follow-up studies into action which will bring improvement, there must be an attitude shared by both faculty and administration which will encourage objective analysis. To be effective, all staff must be involved in both the process of conducting studies and later in implementing its findings.

Aside from agreement regarding the value of faculty participation, there seems to be no consensus regarding the adoption and value of any particular organizational pattern for promoting research activities.

E. Summary and Conclusions

On the basis of information offered to this point, it may be concluded that: (1) there is a great need for educational research in junior colleges; (2) much of this research will have to be accomplished with their own staffs rather than by specialists; (3) these staffs need encouragement to engage in research, as well as training and guidance in research methodology; (4) no effort, as far as can be ascertained, has been directed towards offering an institute for the training of sizeable numbers of the staff of a junior college; nor (5) has there been any evaluation of the effectiveness of such a training approach for increasing research, competency and productivity, professional growth, and institutional effectiveness.

III - DESCRIPTION OF THE PROGRAM

Information is provided in this section of the report regarding the following:

A. A general description of the organization and content of the program.

B. The daily schedule of activities and the Institute calendar.

C. Specific details regarding "A" and "B" above:

  1. Pre-Institute activities of the trainees

  2. Orientation of the trainees

  3. Description of the core curriculum of the Institute - methods and instruments of research and statistics for educational research and the statistics laboratory

  4. Guest speakers

  5. Site visits

  6. Pre-, in-process, and post-testing of trainees

  7. Administration of various evaluation instruments

D. Changes, if any, in the objectives, curriculum, schedule, and staff.

A. The Organization and Content of the Institute Training Program

Described in general terms, the organization and content of the Institute's training program consisted of the following:

1. Introductions and general orientation of trainees.

2. Pre-testing of trainees to determine their general knowledge of statistics and educational research methodology; administration of preliminary evaluation instruments.

3. General exploration and discussion of research interests of trainees.

4. Daily lecture-discussions in statistics and educational research methodology and instruments. Each trainee prepared at least two drafts of a substantial research proposal which was discussed in class seminars and which received the detailed review, criticisms and suggestions of the instructional staff.

5. Daily work in the statistics laboratory where trainees worked on assigned problems under the supervision and guidance of the instructional staff. Trainees also received instruction in the use of calculating machines to assist them in their computational work. Proficiency tests were given in the use of the calculating machines as well as necessary remedial work where indicated.

6. Five guest speakers recognized as experts in their fields gave talks and conducted discussions during the program. A representative of the McBee-Keysort Company also gave a talk and demonstration to the trainees.

7. Three site visits to research and data processing centers plus a visit to an exhibit of educational technology were made during the program.

8. Post-testing of trainees to determine their general mastery of statistics and educational research principles and methodology.

9. Administration of various institute evaluation instruments and a final interview were conducted with the trainees. Evaluation instruments were also administered mid-program, along with periodic informal quizzes and examinations.

B. The Daily Schedule of Activities and the Institute Calendar

The Institute was conducted five days per week from 9 A.M. to 3 P.M., the period for regularly scheduled activities. This block of six hours was divided into three instructional periods, with one hour off for lunch. The first period running from 9:00 - 10:20 A.M. was devoted to lecture-discussions and/or seminars devoted to research methodology and instruments. The second period running from 10:30 - 12:00 noon was devoted to lecture-discussions dealing with statistics. From 1:00 - 3:00 P.M. the trainees worked on statistical problems and exercises under the supervision of the instructional staff. There was some flexibility in this scheduling plan to accommodate "spill-over" discussions, calculating machine instruction, guest speakers, and site visits. In practice, the trainees usually met for lunch in small and large groups with the instructional staff and the guest speakers. Since "institute talk" was the major topic, learning may be said to have continued throughout the Institute day and beyond! Instructional staff members were almost always available before the start of the institute day and after 3:00 P.M. for consultation and assistance. Many of the trainees availed themselves of this opportunity to continue working after 3:00 P.M. in the statistical laboratory. Individual conferences on research proposals were conducted also at this time.

In addition to the regular day-time activities, the trainees were given regular (usually daily) assignments in research methodology and statistics, including readings in the required texts and outside readings. Also, they were expected to work on their draft research proposals.

The overall calendar of activities is to be found in Appendix B. The items in the calendar for each day and period are keyed to the course syllabi which are to be found in Appendix C. For example, item VI-C,D refers to "Types of Research (continued), Experimental and Action."

C-1. Pre-Institute Activities of Trainees

In addition to their submitting the various application and other materials prior to final selection, trainees were required (see Appendix I) to submit an outline of a research proposal dealing with an educational problem in which they were interested and which they planned to work up in detail during their attendance at the Institute.

C-2. Orientation of the Trainees

In addition to the earlier announcements of the program (Appendix I), correspondence dealing with dependency allowances (Appendix I), personal correspondence dealing with individual problems and questions, etc., the entire first morning session of the Institute was devoted to orientation. This included an early morning reception with refreshments. The President of Rockland Community College accorded the trainees a warm welcome and offered to help them in any way possible. In addition, the President spoke of his commitment to the importance of research in the junior college and discussed the kinds of problems he felt research investigations could provide useful answers to an institution. Departmental chairmen, administrative staff members, and many faculty members of Rockland Community College were introduced and all gave assurances to the trainees of their willingness to discuss mutual problems and otherwise help them. The program director and the principal instructor addressed the group regarding the philosophy and objectives of the program.

C-3. Description of the Core Curriculum

The core curriculum of the Institute described below consisted of two lecture-discussion courses: (1) Methods and Instruments of Research, and (2) Statistics for Educational Research and a laboratory course (Statistics Laboratory Course). In both of the lecture-discussion courses Dr. Gerhard Lang, the Principal Instructor, served as the lecturer and discussion leader. Dr. Irvin Hochman, the Program Director, served as a resource person and participant observer at all class meetings. By mutual agreement, and it is believed to the satisfaction and benefit of the trainees, Dr. Hochman joined forces with Dr. Lang in a modified form of "team teaching" by serving as a "devil's advocate," offering supplemental explanations and examples to the topics under consideration, helping to clarify trainee questions and concerns, etc. (One trainee labeled Dr. Hochman as Dr. Lang's "third ear," another as "the Great Simplifier"!)

Methods and Instruments of Research

This course, specially modified for the purposes of the Research Training Institute, served to introduce and/or review the theory and methods of educational research and to guide the trainees in the selection, preparation, and conduct of a research investigation. Classes met one and one-half hours, daily, for six weeks. Class time was divided between consideration of the topics listed below and group seminars dealing with research proposals in process or prepared by trainees. Each trainee was required to work up in detail at least one substantial research proposal dealing with an educational problem in which he was interested. Many of such proposals dealt with problems whose investigation would be valuable to the college. To assist the trainees in the preparation of their draft research proposals, two specially prepared guides, *Format for the Proposal for a Research Project* and a *Checklist for Evaluating a Research Report* were distributed. When each of the required two drafts of the research proposals were turned in by the trainees they were read carefully and comments inked in. In addition, the Principal Instructor indicated on a specially prepared checklist, *Evaluation Form of a Proposal of a Research Study*, whether or not various aspects of the proposal were acceptable or where they needed improvement. Copies of the three forms mentioned above are to be found in Appendix C.

Topics receiving consideration include: orientation to educational research; selection and formulation of a research problem including sources of suggestions for research, research and value judgments, formulation of a problem--theoretical framework, hypothesis, operational definitions; utilization of previous research--educational literature and bibliographic sources, library research techniques, criteria used in analyzing a research report, integration of previous research; measurement in research--general considerations, types of reliability and validity, response sets; types of research--historical, descriptive, experimental, action; methods of research--observation, interview, questionnaire, tests (projective and non-projective), sociometric measures, experimental measures, case studies; statistical analysis--function of statistics in research, review of descriptive statistics, problems of sampling, inferential statistics (testing hypotheses, tests of significance, analysis of variance and covariance); data processing and reporting --processing, organizing and interpreting the data, and writing the report; PERT (program evaluation and review technique); research and the profession of education--careers, sources of support, and problems of publication. Required text: Walter R. Borg, Educational Research - An Introduction, N.Y.: David McKay, 1963. Students were assigned chapters in the Borg text as well as selected readings.

Statistics for Educational Research

This course, specially modified for the purposes of the proposed research training institute, dealt with topics in descriptive statistics and served as an introduction to statistical inference. Classes met for one and one-half hours, daily, for six weeks. Topics receiving consideration included: scope of statistics, symbols and terminology, nature of measurement; organization and presentation of statistical data including frequency distributions, presentation of data in tables, graphical presentation of data; measures of central tendency; measures of variability; measures of relative position; probability, binomial distribution, normal curve; measures of relationship including product-moment correlation, regression and prediction, rank-difference correlation; chi-square; introduction to multi-variate analysis, analysis of variance and covariance. Required text: G.A. Ferguson, Statistical Analysis in Psychology and Education, N.Y.: McGraw-Hill, 1959. Selected Test Service Bulletins, Psychological Corporation. Students were assigned chapters in the Ferguson text, given outside assignments and problems, and outside readings.

The course syllabi of these two core curriculum courses and Institute calendar are to be found in Appendix C.

Statistical Laboratory

Trainees met for at least two hours daily for six weeks in the statistical laboratory to work on assigned statistical problems under supervision and guidance of the instructional staff. Their training included instruction by a specialist in the use of various calculating machines.

Requirements for Completion of the Course Work of the Institute

In addition to regular attendance at the above classes, trainees were expected to participate actively in class discussions and keep the training staff informed of their progress and any problems. A mastery of the principles of statistics and research methodology equivalent to that obtained by successful completion of an introductory graduate level course was the instructional staff's expectancy.

C-4. Guest Speakers

Five guest lecturers recognized as experts and leaders in their fields were invited to discuss research topics in specific areas. In order of their appearance, they included:

1. Dr. Ralph Walter, Chairman of Education Department, Montclair State College (New Jersey), on July 14, 1966.
2. Dr. Elbert K. Fretwell, Jr., Dean for Academic Development, The City University of New York, on July 19, 1966.
3. Dr. Dorothy Knoell, Director, Urban College Study, Office of the Executive Dean for Two-year Colleges, State University of New York, on July 21, 1966.
4. Dr. Walter E. Sindlinger, Professor of Education, Teachers College; and Executive Officer, Center for Community College Administration, on July 26, 1966.
5. Dr. Abraham Tauber, Dean of Faculty, Bronx Community College of the City University of New York, on August 27, 1966.

A very condensed resume of their talks appears in Appendix E. The effectiveness and value of these speakers is discussed in the evaluation section of this report.

C-5. Site Visits

Site visits were made to the Educational Testing Service, Princeton, New Jersey, on July 27; to the Abacus Corporation, New York City, a computer and data processing organization specializing in educational research projects, on August 4; and to offices and computer center of the IBM Corporation, on August 11. Also on August 11 the trainees visited the closeby exhibit of educational technology which was part of the American Management Association's Second International Conference and Exhibit dealing with "Educational Realities."

A summary of the programs given at these site visits is to be found in Appendix D; an evaluation of their usefulness is to be found in Section IV of this report.

C-6. Pre-, In-Process, and Post-Testing of Trainees.

Trainees were administered Form S-1, Achievement Test in Statistics, and Form R-1, Achievement Test in Methods and Instruments of Research, on the second day of the Institute. (See Appendix F.) These two instruments were also administered as post-tests to the trainees on August 18, the next to last day of the Institute. Consisting of 75 multiple-choice items each, the statistics test also included a series of computational problems and the research test included questions calling for definitions and illustrations of selected terms. These two tests were specially developed for use in the Institute because of the lack of standardized tests in these areas. The items selected reflected the content of the Institute course offerings and, as such, are considered to possess content validity. The reliabilities of the two tests (Kuder-Richardson Formula #21 for estimating internal-consistency reliability) were found to be for the statistics achievement pre-test and post-test .86 ($p < .01$) and .81 ($p < .01$), respectively; for the research methods and instruments achievement pre-test and post-test .69 ($p < .01$) and .88 ($p < .01$), respectively. All of these correlations are highly significant.

In order to assure that the trainees possessed proficiency in basic computational operations on the Monroe calculating machines, a special test was developed by the instructor and administered on August 15 to the trainees. After the results were analyzed, trainees received further instruction where this was indicated and were then required to demonstrate subsequent proficiency. A sample of the Calculating Machine Proficiency Test - A is to be found in Appendix F.

C-7. Administration of Various Evaluation Instruments

Throughout the program the Institute staff endeavored to maintain close frank relationships with the trainees in order to obtain informal evaluations of how the Institute was meeting their needs as well as meeting the objectives of the Institute. In addition, more formal evaluation instruments were administered at the beginning, mid-program, and at the end of the program. These consisted of open-end questionnaires and/or rating scales related to the important aspects of the program. Ratings and comments were also obtained following each guest speaker's talk.

At the beginning of the program, trainees were administered the Institute Participant Questionnaire, Form A in which they were asked to state: (1) what benefits they expected to derive from attendance, (2) problems and difficulties anticipated, (3) and (4) their strengths and weaknesses related to their ability to plan and conduct educational research, (5) areas trainees believe should be emphasized, and (6) comments and questions. A sample of this form and a summary listing of trainee comments are to be found in Appendixes F and H.

A Mid-program Reactionnaire was administered to the trainees calling for ratings and comments on the following aspects of the program: (1) lecture content, research and statistics; (2) teaching techniques; (3) program pace; (4) statistics laboratory; (5) program requirements; (6) seminar sessions; (7) ETS site visit and PERT demonstration; and (8) suggestions for modifications and other appropriate comments. A sample of this form and a summary listing of trainee ratings and comments are to be found in Appendixes F and H.

An End-of-Program Questionnaire, Form B was administered to the trainees on the last day of the program. Trainees were asked to rate the same areas they rated at mid-program time, plus these additional items: (1) site visits to Abacus Associates, IBM, Educational Technology Exhibit; (2) demonstration of McBee-Keysort Systems; (3) instruction on use of calculating machine; and (4) overall effectiveness of guest speakers. The trainees were also asked to comment on important aspects of the program. Where possible, these questions referred to or paralleled the same areas as those included in the questionnaire administered at the beginning of the program. Thus it was possible to compare "before and after" perceptions and experiences of the trainees as well as their recommendations for similar institutes that might be held at some future date.

A sample of this form and a summary listing of trainee ratings and trainee comments are to be found in Appendixes F and H.

D. Changes in Curriculum, Objectives, Schedule, and Staff of the Institute.

There were no significant changes made in any of the above. The Institute administrative and instructional staff made a determined effort to adhere to the provisions of the proposal as finally approved for support by the USOE. One minor change in staff might be mentioned. Original budget estimates called for the employment of a part-time research and teaching assistant to do paper grading, tabulating and other clerical work. Written permission to transfer the funds allotted for this purpose to secretarial work was received. The secretarial requirements were greater than anticipated.

IV - EVALUATION OF THE PROGRAM

This evaluation section of this report attempts to appraise significant aspects of the program. In addition to trying to evaluate "what was," an effort will also be made to recommend what aspects of the program might be changed if another program similar to this were directed by the present administrative and instructional staff.

Three sources of information were utilized in making this evaluation: (1) objective test results; (2) program ratings and comments of the trainees, as recorded on the various evaluation instruments administered to them during the program period; and (3) the perceptions and observations of the administrative and instructional staff of the Institute.

Five significant aspects of the program are treated below: A - Program factors; B - Major strengths and unique features of the program; C - Major weaknesses or difficulties of the program; D - Overall evaluation of the program; and E - Recommendations and comments on the USOE's administration of the Educational Research Training Program.

A. Program Factors

The program factors considered here include (1) objectives, (2) program content, (3) staff-ratio, (4) trainees, (5) organization of the Institute.

1. Objectives. As stated earlier, there is a great need for educational research in higher education. There is a national shortage of trained competent researchers and for a number of reasons this shortage is particularly marked in the rapidly growing junior colleges of the country. It would appear that for some time to come much of the needed research, if it is to be done at all, will have to be accomplished by junior college staff members rather than by specialists.

Based on these considerations, the present Research Training Institute was planned. Its three objectives were (1) to encourage, stimulate and support training of excellence in educational research on the part of faculty and administrative staff members of junior colleges with a demonstrated interest in seeking solutions to educational problems, (2) to prepare an evaluatory report upon the completion of the program, and (3) to disseminate this evaluatory report to other junior colleges interested in improving the quality of research conducted in their institutions. Based on the opinions of the Institute trainees, correspondence received from various institutions, the reception accorded the Program Director's paper dealing with junior college research needs delivered at a meeting of all New York State two-year colleges at Delhi Agricultural and

Technical College in the Spring of 1966, personal contacts, other feedback, etc., the present Institute staff is convinced of the worthiness of the objectives of the program. Insight is afforded into the immediate effectiveness of the Institute by information provided below. However, it is recognized that only a follow-up study of the research activities of the trainees during the ensuing years will provide "real life" criteria. Such a follow-up is planned. In the meanwhile, plans to circulate the present report have been made. A proposed symposium dealing with institute research programs has already been submitted for delivery, if accepted, at the 1967 Annual Meeting of the American Educational Research Association.

2. Program content. In evaluating the program content of the Institute, the following areas are considered: (a) focus, (b) topics, (c) laboratory exercises, and (d) field trips.

(a) Focus. The focus of the Institute was upon providing the trainees with basic skills required to do competent educational research. While trainees were encouraged to deal with all types of educational research problems (see Appendix A, Table 23) there was considerable emphasis placed upon institutional research. Where one draws the line between so-called "types" of research is difficult to say, but they all share one thing in common in that each is difficult to do well!

At the time the trainees began the Institute, practically all indicated that the most important benefits they hoped to derive from the Institute were improved research skills. (See Appendix H, Table 27.) At the end of the program, the overwhelming majority referred to the helpfulness of the program content and 14 out of 18 believed that they had achieved greater abilities to do effective research and/or a desire to participate actively in scientific research. (See Appendix H, Table 29.)

The Institute staff believes that the focus they adopted in the Institute was satisfactory and would do the same if a similar Institute were conducted again.

(b) Topics. The selection of topics for inclusion in the core curriculum of the Institute was based upon a number of considerations: (1) the determination of the Principal Instructor, in consultation with the Program Director, of what they believed to constitute the basic skills and knowledges required to do educational research; (2) the experience of the Principal Instructor and Program Director in the direction of research projects and supervision of graduate students; and (3) a review of the topics usually included in introductory graduate courses. The final selection reflected all of these.

Trainees rated the lecture content of the research methodology and statistics courses very high, both at the mid-program point and at the end of the program; on a rating scale ranging from 1 (not worthwhile) to 7 (worthwhile), research was rated at 6.3 and 6.7 and statistics at 6.2 and 6.0 respectively. They did have comments, however, regarding the program pace and requirements which are discussed later in the report.

The Program Director and the Principal Instructor both believe that the selection of topics was generally satisfactory. Their depth of treatment was not compromised during the Institute. However, it was clear that type of trainee selected, his motivation and background were important factors. In this connection the positive gains demonstrated by the trainees (see Appendix G) are worthy of note.

If the program were conducted again, the present staff believes the selection of topics treated should remain essentially the same.

(c) Laboratory exercises. The exercises used in the Statistics Laboratory were selected by the Principal Instructor for their usefulness in demonstrating basic statistical principles and computations. His long experience in teaching statistics was brought to bear in this selection. The trainees rated the Statistical Laboratory's helpfulness at 5.9 at mid-term and 6.3 at the end of the program (scale 1-7). It might be inferred that this bears some relationship to their satisfaction with the exercises they were expected to complete.

The Program Director and Principal Instructor believe that the selection of exercises was generally quite satisfactory and would use much the same type if the program were offered again in the future.

(d) Field trips. To possible questions regarding values of trainee site visits to active research centers, data processing centers and the like, it is believed that such visits did possess many values to the Institute trainees. These included personal contact and interaction with experts and specialists, the opportunity to learn about the latest developments and programs (and problems) of major organizations firsthand and the opportunity to see and even handle the latest advances in educational technology and media. The need for "breaking the routine" had a special value in itself that was considered important in the case of a concentrated summer program such as this.

The reactions of the trainees to the site visits were extremely variable and each trainee seemed to take something different and unique from the visits. Typically, comments ranged from "inspirational" to "waste of time" for the same visit. More specifically, the mean ratings (scale 1-7) for the ETS visit was

5.2, for the visit to the Abacus Associates, 5.6, to IBM Corporation 4.8, to the Exhibit on Educational Technology 5.8. The mean of means was 5.4, a substantially positive indication of their perceived values.

The Program Director and the Principal Instructor were of the opinion that the site visits were indeed valuable. They both found them interesting and productive of ideas for further research efforts. The visit to ETS, Abacus Associates, and the Educational Technology Exhibit seemed particularly noteworthy. A portion of the IBM program was not geared as closely as it might to the needs of non-engineering or scientific faculty, but the other aspects of the program were definitely quite useful and informative.

If another institute similar to the present were conducted again, visits to all of the organizations mentioned above would be recommended, particularly if changes were possible in some aspects of the IBM presentation. Consideration had been given to possible visits to Bell Telephone Laboratories, IBM's Yorkstown Laboratories, the University of Connecticut, Psychological Corporation, Teachers College, Columbia University, but either because of the time of the year or inability to arrange a suitable program, these were not possible, despite the positive reaction of the persons contacted. In future institutes, other possible site visits should be explored.

3. Staff-trainee ratio. The staff involved in the conduct of the Institute program consisted of the Program Director, the Principal Instructor, and one part-time instructor in the use of calculating machines. Time allocations originally submitted called for the Program Director to spend his time as follows: 20 percent teaching, 20 percent administration, and 60 percent in research. In the case of the Principal Instructor his original time allocations were 90 percent teaching and 10 percent research. The calculating machine instructor was budgeted for 20 hours and used this time for instructional purposes fully.

The 18 trainees' appraisal of the ratio of administrative-teaching staff to the number of trainees (Appendix H, Table 29) showed that 10 believed the ratio to be satisfactory or better, 3 recommended two full-time instructors, 1 recommended the occasional use of consultants, 1 wanted individual tutoring, 1 described the staff as overworked, 2 had no comment. These recommendations have to be considered along with their other expressions of overall approval of the major aspects of the program. The high level of interest of the trainees, a somewhat natural desire for more individualized attention, and the felt-pressure of a demanding course of study are other possible factors in recommendations of some of the trainees for additional staff.

The Program Director and the Principal Instructor both would recommend that with the exception of an additional part-time assistant in the statistical laboratory there should not be any change in the ratio of staff to trainees. This proposed statistics assistant would be able to handle routine statistical problems and questions as they arose, while the Principal Instructor and Program Director could devote more time to individual conferences and discussions with trainees regarding their research projects. Considerable time was needed during the statistical laboratory for "beefing up" individual trainees in statistical principles. A heavy proportion of the individual meetings with trainees regarding their research proposals was conducted after the regular Institute hours. Administrative paper work, paper grading, and the reading of individual proposals, etc., assumed a night-work character for both the Program Director and Principal Instructor. No attempt will be made here to define a "professional work day" other than to allude to the "stretchability" of original time allocation percentages.

One calculating machine was available for every two trainees. Though rental is fairly expensive, one machine per trainee would have enhanced instructional efficiency and work on exercises greatly. This is recommended for any future institute.

The number of hours (20) devoted to machine operation instruction and the quality of instruction received seemed quite satisfactory. The trainees' mean rating of 6.3 (scale 1-7) and their very positive comments indicate it was, indeed, a worthwhile aspect of the program.

4. Trainees. In the evaluation of the Institute trainees, the following aspects will receive consideration: (a) selection criteria, (b) class size, (c) commuter problems, and (d) geographical distribution factors.

(a) Selection criteria. The criteria for selection of trainees were personal qualifications, educational and experience background, and recommendations of persons acquainted with their qualifications and abilities. Since the Institute was designed for junior college personnel recruitment was, of course, restricted to such institutions. In the selection of trainees, a major consideration was evidence of their interest in finding solutions to educational problems and of their interest in improvement of their research competence through a program of intensive training in research methodology. Since telephone conversations and personal interviews were conducted with a number of the trainees prior to their selection, an opportunity to guage their interest and motivation was afforded. Thus, vacation-away-from-home seekers and those for whom the Institute would represent a minor aspect of their interests and activities were dissuaded from making application. Also, since USOE policy regarding dependency allowances did not permit payment where the spouse and children remained at home, this too served as a sort of restrictive selection criterion. Trainees had to be either single, willing to bring their families to Rockland County with them, or able to afford to leave them home. This, in effect, reduced sharply the number of possible selectees. A number of potential trainees residing in or near Rockland County, including the College staff, apparently did not apply for this reason. Those that did, on the other hand, were no doubt rather highly motivated and interested in the Institute. A sample application form and other recruitment materials, including announcements, letters, etc., are to be found in Appendix I.

It is believed that the complement of 18 trainees finally selected for the Institute met the above selection criteria. In the case of one trainee who had submitted excellent paper qualifications and recommendations, it was learned at the end of the Institute that this person had been "volunteered" by the college administration. Interestingly, this same trainee rated most aspects of the program negatively, though making excellent personal progress! The relatively late date of USOE approval for the Institute, faulty distribution of mailed information regarding the program to faculty and staff, restricted dependency allowances, etc., no doubt reduced the size of the pool of applicants from which selections might have been made. However, a review of applications received after the full number of applicants had been selected indicated no clear evidence of their marked superiority or special qualifications.

Detailed information regarding the characteristics of the junior colleges represented at the Institute and general information dealing with the personal characteristics, education, and experience backgrounds of the trainees is to be found in Appendix A. In summary, a total of 16 junior colleges located in 7 states in the eastern half of the United States with total enrollments ranging from less than 100 to nearly 4,000 students was represented. The median total enrollment was about 1,500 students. Fourteen were public, 1 independent, non-profit, undenominational, and 1 Catholic. Twelve trainees were male and 6 female, with their median age falling in the 40-44 age bracket. Fourteen held teaching positions in a wide variety of disciplines, 2 were librarians, and 2 held administrative positions. The modal rank for teachers was assistant professor, with 7 holding this rank. Fifteen of the 18 trainees held master degrees, 2 doctorates, and 1 an A.A.S. degree. Though two-thirds had taken graduate credits beyond their highest degree, about this same number were not currently taking graduate courses and were not candidates for advanced degrees.

The number of years elapsing since the trainees received their highest degree ranged from 1 to 10 or more years with the median being about 4 years. Eleven had never taken a statistics course before, 3 one course and 4 two courses. Twelve had never taken a test and measurements course and 6 had had one course. Thirteen had some form of research methodology course or masters' and/or doctoral seminar prior to enrollment in the Institute. Eleven had

1 to 10 or more years of elementary or secondary school teaching experience. The number of years of junior college teaching experience ranged from 1 to 10 years with a median of 4 years experience. Seven had had 1 or more years of senior or university teaching experience. Ten had had a year or more of business experience. Only 3 had published anything beyond their masters' thesis or doctoral dissertation.

A general description of the characteristics of junior college personnel was included in the Introduction of this report. A comparison of the characteristics of the 18 Institute trainees with this general description reveals a substantial similarity; the trainees constituted typical junior college "types."

In the trainees' appraisal of the selection criteria it was evident that they were not completely satisfied, though only 3 believed the criteria to be unsatisfactory. The major recommendation was that trainees should have a background in mathematics and statistics or that there be pre-institute preparation and study.

The Program Director and Principal Instructor recognize that a strict requirement that all trainees selected possess strong mathematics or statistical backgrounds would tend to eliminate many individuals who would benefit most from such training and who were in a position potentially to make a genuine contribution to their institutions. It is believed that with earlier selection of trainees who have been informed regarding the possible "rigors" of statistics and who will have had the time to read in advance a text such as H. M. Walkers's *Mathematics Essential for Elementary Statistics*, to look over and/or read one of the excellent programed texts such as C. McCollough and L. Van Atta's *Statistical Concepts*, as well as the course text itself, would take care of the major aspects of the problem.

Another legitimate approach to the problem of trainee selection and one that could be argued might prove more effective than the relatively "open door" policy recommended above deserves discussion.

Correlations between the research achievement pre- and post-tests was found to be .68 and between the statistics pre- and post-tests was found to be .74. Both of these correlations are highly significant. The correlation between the research achievement pre-test and the statistics achievement pre-test was found to be .69, between the post-tests to be .76.

These highly significant correlations serve to point up the fact that the trainees who came to the Institute better prepared also achieved at a higher level. If a large enough pool of interested applicants were available, arrangements might be made to test them before final decisions are made regarding acceptance of their applications. This "restrictive selection" procedure might yield a better type trainee. It is recognized, of course, that whether test scores are also correlated with subsequent research productivity remains to be determined. Such a speculation seems to have some basis.

In summary, if another institute similar to this were held, criteria for selection would remain essentially the same, with the additional recommendation of pre-institute preparatory work in mathematics and statistics and possibly of pre-testing prior to final selection. Earlier selection would also be desirable.

(b) Class size. Somewhat contradictorily, it can be noted that while a number of the trainees recommended more individualized treatment, 14 of the 18 believed the class size was satisfactory or better and 4 believed it could be increased, some recommending up to as much as 25 trainees.

The Program Director and Principal Instructor believe that the number of trainees was about right. With the addition of an assistant in the statistical laboratory, the number could be increased to as much as 21-23 trainees. The number of hours of calculating machine instruction would have to be increased proportionately. This would be their recommendation if a similar institute were held in the future.

(c) Commuter problems. No special problems were experienced here by trainees living at home. Because the location of Rockland Community College is not too handy to public transportation, ownership of an automobile is desirable. In the case of several out-of-town trainees who did not own cars, provisions were quickly arranged for rides.

(d) Geographical distribution. Seven states were represented at the Institute: New York (9 trainees), Maryland (3), Pennsylvania (2), North Carolina (1), Massachusetts (1), Florida (1), Mississippi (1). There is a strong face validity to the concept of having a wide geographical distribution of trainees at an Institute. Some of the more obvious values are the ability to share and learn from people from widely differing backgrounds and institutions. Also, the opportunity to appreciate better the commonality of many of the problems that must be met in junior colleges and higher education is valuable.

If another institute similar to this were held in the future a wide geographical distribution of trainees should again be strived for, if possible. The necessity of preparing and posting large numbers of recruitment announcements, carrying on correspondence with interested applicants and institutions is time consuming and expensive. On the balance, however, this is believed to be highly desirable. And if the overall evaluation of the USOE regarding institutes such as this is positive, it might be interested in supporting institutes in other geographical areas where interest has been stimulated by information received from this institute.

5. Organization of the Institute. In evaluating the organization of the Institute consideration is given to the following items: (a) timing, length of program, (b) daily schedule, (c) facilities-classroom and housing; and (d) the budget.

(a) Timing and length of program. The trainees did not seem to have many strong opinions about either the timing or length of the program. Of those expressing opinions, 6 believed the six-week period was satisfactory and 6 thought it should be longer. Of the latter, 3 recommended eight weeks, and 3 as much as 9-12 weeks. Only 2 thought the program should be very much shorter.

Though only 6 trainees recommended that the program start several weeks earlier, the Program Director and the Principal Instructor believe that the program would have benefited by an earlier start. August 19, the closing date, was almost the end of summer and left them, at least, with very little time for a respite before the fall semester began. The Program Director would have welcomed additional time to prepare the final report before the fall term began. Of course, there is no way of knowing how many applications would have been received if the program dates had been different.

A period of 6 weeks to cover the course material seemed satisfactory and would be recommended if a similar institute were offered again. A longer period, of course, would mean that the pace might be somewhat slower and materials treated in greater depth. However, it would be a very long time for many trainees to be away from home and family.

(b) Daily schedule. Only brief reference will be made to the hourly schedule of the program since this has been described earlier in Section II of this report. Greater emphasis will be placed upon the program requirements and pace.

With respect to the number of actual hours spent in class and laboratory, 16 trainees were evidently quite satisfied with the daily schedule. One trainee recommended a longer work day and one each asked for more "breaks," less homework, and less statistics.

The Program Director and the Principal Instructor believe the daily schedule was generally satisfactory. Trainees were not riveted to their seats during the lectures. They always felt free to get up and help themselves to the everpresent coffee urn and light snacks provided by the college as well as birthday cakes and other special treats brought in by the trainees themselves.

Both at mid-term and at the end of the program, the trainees indicated that the program requirements were on the excessive side and the pace too fast. On a scale of (1-7), at mid-term and at the end of the program the mean ratings of program requirements were 5.2 and 5.4 respectively; for program pace they were 5.3 and 5.5 respectively.

Stated very simply, the trainees worked hard and were worked hard by the staff. For example, a number of trainees spontaneously organized special night-time statistics briefing sessions where those who were better prepared assisted the less prepared. The post-test results and overall evaluation of the program speak for themselves.

The Program Director and the Principal Instructor who are probably believers in the virtues of hard work would possibly set the same kind of demands upon trainees if they conducted a similar institute. Feelings of pressure experienced by some of the trainees would be greatly lessened if some pre-Institute preparedness were possible.

(c) Facilities. The facilities provided for the Institute by Rockland Community College were a great source of satisfaction to the staff and trainees. One very large well-lighted and equipped room in its new air-conditioned classroom that overlooked the beautiful Ramapo Mountains was set up for the use of the Institute. One half was furnished with work tables and calculating machines for use as the statistical laboratory. The other half of the room served as the center for lectures and seminars in research methodology. Every morning a table was set up for coffee and snacks which were continuously available. Typewriters in the business department typing classroom were made available to the trainees. Duplicating facilities for research proposals and classroom handouts provided fine service. The maintenance staff treated the trainees as the guests they were of the College.

The College library served the needs of the staff and trainees admirably, with only some highly specialized materials being unavailable. In preparation for the Institute, the Program Director had ordered a wide range of research texts, periodicals, and reprints. Materials dealing specifically with junior colleges which were not readily available and/or familiar to the trainees were also assembled. These were found to be most useful, both for the immediate purposes and future work of the trainees.

Perhaps the only facility that was lacking was a college cafeteria or dining room; one was being built during the time the Institute was held. Trainees did however join together in groups in closeby restaurants; one provided a private dining room for the Institute's use.

The comments of the trainees reflect this positive description of the College facilities. Six characterized the facilities as excellent or perfect, 3 as more than adequate, very adequate or great, 3 as fine or good, 1 wrote "location greatest asset," 3 wrote special praise for the College President, College staff, the library and library staff. Only 1 criticized the library as being "dismal and too far from Teachers College," and 1 noted the lack of a cafeteria.

Since Rockland Community College is a community college it lacks residence facilities. To assist trainees in finding suitable housing, newspaper publicity and other efforts were directed to provide trainees with several large lists of homes, apartments, and furnished rooms. (See Appendix I.) Final selection and financial details were the responsibility of the trainee. Since temporary housing with all the implications related to creature comforts, non-availability of the familiar and accustomed, etc., is bound to be a sensitive area, the comments of the 14 non-resident trainees were, in general, most gratifying. Eight described their housing facilities as excellent, superb, fine, or most desirable, 1 as "O.K.," 2 as fair. Two characterized their arrangements as poor and 1 referred to the rent as high.

(d) The budget. In general, actual expenditures reflected approved budget estimates very closely. At the time this section of the final report was being prepared there had not been a final reconciliation of figures but some surpluses are probable in (1) trainee travel and relocation costs, (2) dependency allowances, and (3) travel related to site visits, etc. A small over-expenditure to pay the honorarium of one additional guest speaker was made. Stenographic requirements will probably exceed original estimates, but permission to transfer unexpended funds allotted for a research and teaching assistant has been secured from the USOE.

If adjustments were made to take into consideration the above items, it is believed that the basic budget estimates and expenditures for this Institute provide an excellent basis for projecting the needs for a similar institute if one were held in the future. Additional provisions are recommended to reimburse the administrative and teaching personnel for the considerable organizational and preparatory work prior to the start of the Institute, as well as for the time spent in the preparation of the final report. Some allowance was made for this, but it is not believed to be completely adequate.

B. Major Strengths and Unique Features of the Program

The major strengths and unique features of this Institute program are believed to be the following:

1 - that the program attempted to deal with the problem of shortages in trained research personnel in an area of higher education, the junior college, which has been virtually neglected heretofore;

2 - that an evaluation component was built into the program in an attempt to measure its effectiveness;

3 - that the trainees were aware of and willing to cooperate frankly and openly in this evaluation effort;

4 - that the trainees manifested a high overall level of interest and willingness to work hard;

5 - that the administrative and teaching staff was well prepared through academic training and experience, dedicated and committed to its responsibilities;

6 - that the teaching techniques were skilled, flexible and highly individualized. As an example, the modified "team teaching" of the Program Director and the Principal Instructor has been cited elsewhere. Also, the use of small discussion groups of trainees with "roving" instructors was another technique that was used several times to help trainees with their research proposals;

7 - that the facilities and cooperation provided by Rockland Community College were excellent;

8 - that the array of guest speakers was very impressive, both from the point of view of previous breadth of experience, and also effectiveness of presentation;

9 - that the site visits were an unique opportunity for the trainees. The "red carpet" treatment they received was most gratifying and reinforced the importance of their training;

10 - that a number of new research techniques were brought to their attention, e.g., PERT;

11 - that research was consistently presented to the trainees not merely as an accumulation of techniques, but also as an exercise in precise, straight thinking which must be planned and reported in a clear, organized manner;

12 - that research was of the greatest importance to education was constantly reinforced, as was the possible contribution the trainees were in a position to make for their institutions (and themselves).

C. Major Weaknesses or Difficulties

In attempting to describe major weaknesses or difficulties, there is an awareness that distinction has to be made between problems that have to be dealt with that are inherent and inevitable in organizing and administering a new venture and true weakness or unusual difficulties.

From the vantage point of the Program Director, several difficulties presented themselves. One grew out of the relatively late date of final USOE approval of the Institute. The fact that a public announcement could not be made and uncertainty about how far informal recruitment efforts might go was a source of anxiety. Other difficulties included the initially slow response to recruitment announcements. The inability to be able to state unequivocally to the trainees that all conditions were "go" made for an undesirable situation. The small initial "pool" of applicants and the decision to accept what was available raised questions whether or not the "best" supply of trainees had been secured. Fortunately, the early applicants presented excellent credentials and this was not really a problem. The strict USOE interpretation of the dependency allowance regulation resulted in the loss of many other desirable applicants.

In summary, the major problems and difficulties were in getting the Institute underway not in its conduct once things got rolling. It should be stressed that the USOE Research Training Branch was most sympathetic to these problems. A number of valuable suggestions were made on ways of dealing with the recruitment problems, which were followed by an immediate dramatic increase in the number of applicants. These included widening the recruitment area, direct personal and telephone contacts with interested institutions and applicants, etc.

D. Overall Evaluation of the Institute - Summary

Objective test results, program ratings and comments of the trainees, and the perceptions and observations of the Institute staff all provide a basis for satisfaction with the program and accomplishments of the Institute.

On the Achievement Test on Statistics, the trainees showed a mean gain of 32.2 points and on the Achievement Test on Methods and Instruments of Research, a mean gain of 30.1 points. Both gains were highly significant. (See Appendix G, Table 24.)

The 18 trainees' overall evaluation of the Institute program revealed that 7 felt that it had been extremely valuable, 2 of very substantial value, 6 of substantial value, 2 valuable, and 1 fairly valuable. (See Appendix H, Table 29.)

The Institute staff derived great satisfaction in conducting this Institute program and believe that they have learned much about the research training needs of junior college personnel. Some of their insights have been, hopefully, communicated in this report. The significant gain scores obtained in the objective tests, the many positive comments of the trainees regarding various aspects of the program as well as their overall evaluation provide some assurance that the approach adopted had merit. The tremendous improvement in the quality of organization and thinking that was manifested progressively in the outline, first draft, and second drafts of the trainees' research proposals augers well for their future skills as educational researchers. However, time will tell.

E. Recommendations and Comments on the USOE's Administration of the Educational Research Training Program

The Program Director of this Institute believes that the USOE has done a fine job in its administration of the complex educational research training program. The range and type of programs it has selected for support show great sensitivity to the educational research needs of the country. The inclusion of the present program was a great source of personal pride and satisfaction. The various instructional guidelines, forms, regulations, etc., have been remarkably free of ambiguity; this is no small achievement. Telephone contacts with the Research Training Branch and other administrative units have been business-like, but friendly and helpful. Answers to written inquiries have been generally prompt and to the point.

It is believed that program directors of newly organized institutes would be helped if well before the start of their program they received a complete packet of necessary materials, including the requirements for a final report. More details about the amount of flexibility possible between the various subcategories of the budget would also be useful. An earlier final approval notification would be tremendously helpful for recruitment.

Possibly provisions for at least one trip to the USOE's offices to thrash out details might be a good investment. The USOE representative could, on the basis of his broader experience, point out many areas that require clarification or emphasis. The personal interaction is always valuable.

V - PROGRAM REPORTS

This final portion of the report is divided into five sections which deal with: A - publicity, B - application summary, C - trainee summary, D - Program Director's attendance, and E - financial summary.

A. Publicity.

Publicity related to the Institute consisted of mailed announcements, newspaper releases, and printed references to the program that appeared in a number of professional media. Copies of these materials are to be found in Appendix K. Other publicity included telephone calls to various junior colleges.

Starting with the last week of April 1966, a "wave" of packets containing letters from the President of Rockland Community College to the presidents of junior colleges located in New York State (and gradually to states over the eastern seaboard) were mailed. These also contained descriptions of the program, several application blanks, and directions to Rockland Community College. Over a period of about 4 weeks over 250 of these packets were mailed.

Response was rather disappointing and on the advice of the USOE that direct contacts were more effective, approximately 90 telephone calls were made to the offices of presidents of junior colleges located in the Rhode Island, New York, Connecticut, Pennsylvania and Massachusetts area. Over one-third of the presidents and presidential secretaries contacted did not recall seeing the information previously mailed out, 24 volunteered that their faculty was already committed, and 7 said there was no interest in the Institute. Promises to explore the matter with their staffs were forthcoming. Additional materials were mailed to these institutions and a gratifying pick-up in applications was soon experienced.

Other publicity included: (1) a description of the program and a request for housing for trainees in the Rockland County Journal News on June 20, 1966; (2) a news item mentioning the program released from the USOE in the New York Times on June 6, 1966; references to the program in the American Psychologists, August 1966, Educational Psychologist Newsletter, June 1966, and the AERA Newsletter, June 1966.

The Program Director described the program to a large group meeting dealing with research at the annual meeting of New York State two-year colleges at Delhi, New York on June 19, 1966.

B. Application Summary.

Approximately 25 inquiries about the program were received from Rockland Community College faculty. About 30 telephone inquiries were received, mostly from New York and adjoining states. About 25 written inquiries were received from institutions and individuals, the former being mostly college deans. There were 49 first-rank applicants.

Budget allotments for trainees made provision for a total of 18 trainees. In the process of filling this allotment, 22 applicants were offered admission with 4 subsequently withdrawing for a variety of reasons.

C. Trainee Summary.

Eighteen trainees were initially accepted and this same number completed the program. They were all, of course, junior college faculty or administrators.

D. Program Director's Attendance.

There were 30 instructional days in the Institute's program. The Program Director was present and participated actively in the program activities full-time and "over-time" during the entire program with the exception of part of one day!

E. Financial Summary.

	Budgeted	Expended or Committed
Trainee Support		
1. Stipends	$ 8,100.00	$ 8,100.00
2. Dependency allowances	3,240.00	2,250.00
3. Travel	1,000.00	956.48
Direct Costs		
1. Personnel	4,521.00	4,201.00*
2. Supplies	300.00	300.00*
3. Equipment	450.00	450.00
4. Travel	698.00	450.00*
5. Other	--	--
Indirect costs	1,465.00	1,465.00
TOTAL	$19,774.00	$18,172.48

*Estimated

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APPENDIX A

Background Information Regarding Institute Trainees

1. Characteristics of junior colleges they represent.
2. General information.
3. Education and experience.
4. Research proposal topics selected for development.

Table 1

Names, Positions, and Institutions of Participants Attending Research Training Institute for Junior College Personnel

---

1. Jack Donald Ballard
   Director of Evening Division and Extension Program
   Davidson County Community College

2. Everett G. Beckman
   Chairman, Division of Liberal Arts
   York Junior College

3. Joseph M. Famellette
   Assistant Professor, Physical Education
   Rockland Community College

4. Lewis Henry Hughes
   Associate Professor, Accounting
   Borough of Manhattan Community College

5. John Orr Hunter
   Associate Professor, Social Science
   Niagara County Community College

6. Thomas William Kirkconnell
   Professor of Modern Languages
   Allegany Community College

7. George Robert Kissell
   Assistant Professor of History
   Williamsport Area Community College

8. Karl Kolbe
   Assistant Professor, Social Sciences
   Erie County Technical Institute

9. Aino Lukas
   Assistant Professor, Physical Education
   Rockland Community College

10. Richard L. Neale
    Instructor, Sociology
    Northern Essex Community College

(Table continued on next page)

Table 1 (continued)

11. JoAnn Frances Morici
    Assistant Professor, Nurse Education
    Rockland County Community College

12. Grace Loretta Murray
    Associate Professor of Biological Sciences
    Monroe Community College

13. L. E. McMurtry-Reed
    Librarian
    Harris Junior College

14. Ralph Congdon Sparks
    Assistant Professor, Mechanical Technology
    Westchester Community College

15. Joseph J. Stangl
    Assistant Professor, Social Sciences
    Agricultural and Technical College

16. Maurice Lewis Sutton
    Professor of English
    Polk Junior College

17. Ida Swearingen
    Instructor, History
    St. Mary's College of Maryland

18. Sister Mary Leona Williams
    Assistant Librarian
    Mount Providence Junior College

Table 2

Junior Colleges Represented at the Institute (N = 16)

Name	State	Control or Affiliation	No. of Trainees	Total Enrollment[a]
Borough of Manhattan Community College	New York	Public	1	1695
Niagara County Community College	New York	Public	1	2236
Erie County Technical Institute	New York	Public	1	2210
Rockland Community College	New York	Public	3	2453
Monroe Community College	New York	Public	1	3512
Westchester Community College	New York	Public	1	3914
Agricultural and Technical College at Morrisville	New York	Public	1	1442
Davidson County Community College	North Carolina	Public	1	683
York Junior College	Penna.	Independent (non-profit, undenominational)	1	1887
Williamsport Area Community College	Penna.	Public	1	1894
Allegany Community College	Md.	Public	1	621
St. Mary's College of Maryland	Md.	Public	1	448
Mt. Providence Junior College	Md.	Cath.	1	64

(Table continued on next page)

Table 2 (continued)

Name	State	Control or Affiliation	No. of Trainees	Total Enrollment
Northern Essex Community College	Mass.	Public	1	969
T. J. Harris Junior College	Miss.	Public	1	259
Polk Junior College	Florida	Public	1	1067

[a]Enrollment as of October 1965. Source: Junior College Directory (1966), American Association of Junior Colleges, Washington, D.C.

Table 3

Total Enrollments of Junior Colleges Represented at the Institute

Total Enrollment	Institutions
Under 100	1
100 - 499	2
500 - 999	3
1,000 - 1,499	2
1,500 - 1,999	3
2,000 - 2,499	3
2,500 - 2,999	0
3,000 - 3,499	1
3,500 - 3,999	1

Median Total Enrollment - 1,500 students

Table 4

Control or Affiliation of Junior Colleges Represented at the Institute

Public	14
Independent, Non-profit Undenominational	1
Catholic	1
Total	16

Table 5

Distribution of Trainees by Sex

Male	12
Female	6

Table 6

Distribution of Trainees by Age (to nearest whole year)

Years	Trainees
25 - 29	1
30 - 34	3
35 - 39	3
40 - 44	5
45 - 49	4
50 - 54	1
55 - 59	0
60 and over	1

Table 7

State of Residence of Trainees

State	Number
Florida	1
Maryland	3
Massachusetts	1
Mississippi	1
New York	9
North Carolina	1
Pennsylvania	2
Total of 7 States Represented	

Table 8

Title of Trainees' Positions
N = 18

Title	Number
Instructor	2
Assistant Professor	7
Associate Professor	3
Professor	2
Director of Evening Division and Extension Program	1
Chairman, Division of Liberal Arts	1
Librarian	2

Table 9

Subject Areas or Administrative Responsibilities of Trainees

Area	Number
Physical Education	2
Accounting	1
Social Sciences	4
Language	1
History	2
Nurse Education	1
Microbiology	1
Librarian	2
Mech. Technology	1
English	1
Director of Evening Division and Extension	1
Chairman, Liberal Arts	1

Table 10

Highest Earned Degree of Trainees

Degree	Number
A.A.S.	1
Master's	15
D.S.S.	1
Ph.D.	1

Table 11

Trainees Taking Graduate Courses

	Number
Yes	4
No	14

Table 12

Trainees Who Are Candidates for Advanced Degrees

Yes	6
No	12

Table 13

Total Graduate Credits Received by Trainees Beyond Highest Earned Degree

No. of Credits	Trainees
0	6
0 - 9	2
10 - 19	2
20 - 29	5
30 - 39	0
40 - 49	2
50 - 59	0
60 - 69	1

Table 14

Number of Years Elapsed Since Receiving Highest Earned Degree

Elapsed Years	Trainees
0	1
1	2
2	3
3	2
4	1
5	1
6	1
7	0
8	2
9	1
10	2
10 or more	2

Table 15

Trainees Who Had Taken Statistics Courses Prior to Enrollment in Institute

No. of Courses	Trainees
0	11
1	3
2	4
3	0
4	0

Table 16

Trainees Who Had Test and Measurement Courses Prior to Enrollment in Institute

No. of Courses	Trainees
0	12
1	6

Table 17

Trainees Who Had Research Methodology Courses, Including Masters' and Doctoral Seminars prior to Enrollment in Institute

No. of Courses	Trainees
0	5
1	5
2	4
3	3
4	0
5 or more	1

Table 18

Years of Elementary or Secondary School Teaching of Trainees

Years	Trainees
0	7
1	3
2	2
3	0
4	2
5	0
6	0
7	0
8	1
9	0
10 or more	3

Table 19

Years of Junior College Teaching (including library work)

Years	Trainees
0	0
1	3
2	2
3	2
4	4
5	3
6	1
7	0
8	1
9	0
10	2

Table 20

Years of Senior College and University Teaching

Years	Trainees
0	11
1	2
2	3
3	0
4	1
5	0
6	1

Table 21

Years of Business or Industrial Experience

Years	Trainees
0	0
1	1
2	2
3	0
4	1
5	1
6	1
7	1
8	0
9	0
10 or more	3

Table 22

Publications Other Than Masters' Thesis or Doctoral Dissertation

No. of Publications	Trainees
0	15
1	1
2	0
3	0
4	0
5	1
6	1

Table 23

Topics Selected by Trainees for Development as Research Proposals

1. Library services of public junior colleges in Mississippi.
2. Effectiveness of extension classes at Davidson County Community College as evaluated by attending students.
3. Relationship of flexibility and strength of selected joints to posture of college women.
4. Comparative study of health knowledge: nurse education students and general education students.
5. Criteria for admission of liberal arts transfer students to community colleges in Massachusetts.
6. Comparative study of collectivization of farm land in Czechoslovakia, Poland, and Russia.
7. Student and faculty perceptions of the counseling service at St. Mary's College of Maryland.
8. A study of electronic audio-visual learner-participation techniques for televised language courses.
9. A rating scale for clinical performance of nursing students.
10. The effects of numerical controlled machines on industrial and technical education.
11. A comparative analysis of the attitudes of faculty and administrators of the community colleges in New York State.
12. Freshman English: a junior college approach.
13. Use of the overhead projector as a means of improving the teaching of a freshman survey course in World Civilization in Williamsport Area Community College.
14. A survey of microbiology curricula in New York State junior colleges.
15. A study of selected characteristics of freshman and sophomore commuting students at York Junior College.
16. A study of academic rank systems for junior colleges.
17. Follow-up study of the Borough of Manhattan Community College graduates who had not pursued a college preparatory course in secondary school.
18. A study of student value changes among the students of the first class at the State University of New York Urban College at Buffalo.

APPENDIX B

Institute Calendar

Rockland Community College of the
State University of New York

Research Training Institute for Junior College Personnel

Dr. Irvin Hochman
Program Director

Dr. Gerhard Lang
Principal Instructor
and Consultant

Calendar for July

Day	First Period (approx. 9-10:20 AM)	Second Period (approx. 10:30-12 noon)	Third Period (approx. 1-3 PM)
11	Welcome and Orientation		Introduction by Trainees
12	Reactionnaire-Form A	Pretest (Research)	Pretest (Statistics)
13	Res. I.A,B	Machine Instruction	Machine Instruction
14	Stat. I.A,B,C	Speaker: Dr. Walter	Stat. Lab I.A-C
15	Seminar	Machine Instruction	Seminar
18	Res. II.A-C	Stat. II.A,B,C	Stat. Lab II.A-C
19	Res. III.A-D	Speaker: Dr. Fretwell	Stat. Lab II.A-C
20	PERT (film and demonstration)		Stat. III.A
21	Seminar	Speaker: Dr. Knoell	Stat. Lab III.A
22	Seminar,	Stat. III.B,C	Stat. Lab III.B,C
25	Res. V.A	Stat. Test #1	Review of Stat. Test #1
26	Res. V.B,C	Speaker: Dr. Sindlinger	Stat. IV.A-C
27	Trip to ETS (Princeton)		
28	Res. VI.A,B	Stat. Lab (IV.A-C)	Stat. Test #2 & Review
29	Seminar	Stat. V.A,B	Stat. Lab V.A,B

Rockland Community College of the
State University of New York

Research Training Institute for Junior College Personnel

Dr. Irvin Hochman
Program Director

Dr. Gerhard Lang
Principal Instructor
and Consultant

Calendar for August

Day	First Period (approx. 9-10:20 AM)	Second Period (approx. 10:30-12 noon)	Third Period (approx. 1-3 PM)
1	Res. VI.C,D	Test #2	Stat. VI.A,B
2	Res. VII.A-C	Stat. VI.C	Stat. Lab VI.A-C
3	Res. VII.D	Test #4	Review of Test #4
4	Seminar	Stat. VII.A	Trip to Abacus Assoc.
5	Seminar	Stat. VII.B	Stat. Lab VII.A,B
8	Res. VII.E	Stat. VII.C & Lab.	Test #5 and Review
9	Res. VII.F-H	Stat. VII.D	Test #6 / Stat. VII.D
10	Res. VIII.A,B	Stat. Lab VII.D	
11	Trip to IBM and AMA		
12	Seminar	Test #7	Review of Test #7
15	Res. IX.A-C	Stat. VIII	Lab Stat. VIII
16	Res. X.A-C	Stat. IX	Lab Stat. IX
17	Seminar	Speaker: Dr. Tauber	Seminar
18	Reactionnaire - Form B	Post-test (Research)	Post-test (Statistics)
19	Review of Activities and Farewells		

APPENDIX C

Institute Course Syllabi

1. Methods and Instruments of Research
2. Statistics for Educational Research
3. Format of the Proposal for a Research Project
4. A Checklist for Evaluating a Research Report
5. Evaluation Form of a Proposal of a Research Study

Rockland Community College
of the State University of New York

Research Training Institute for Junior College Personnel

Dr. Irvin Hochman
Program Director

Dr. Gerhard Lang
Principal Instructor
and Consultant

Methods and Instruments of Research

Text: Walter R. Borg *Educational Research - An Introduction.*
New York: David McKay, 1963.

David Krathwohl *How to Prepare a Research Proposal.*
Syracuse: Syracuse University Bookstore, 1966.

William G. Campbell *Form and Style in Thesis Writing.*
Boston: Houghton Mifflin Co., 1954.

Topic	Assignments
(Week of 7/11-7/15)	
I. Orientation	
A. Science of Educational Research	Ch. 1,2
B. The research process	
(Week of 7/18-7/22)	
II. Selection and Formulation of a Research Problem	
A. Sources of suggestions for research B. Research and value judgments C. Formulation of a problem	Cooperative Research Project Proposals #1750 and #S-028; Krathwohl's pamphlet
III. Utilization of Previous Research	
A. Educational literature and bibliographic sources	Ch. 3,15 and specific studies to be assigned
B. Library research techniques	
C. Criteria for analyzing a research report	
D. Integration of previous research	
IV. PERT (Program Evaluation and Review Technique)	

Methods and Instruments of Research (cont'd)

(Week of 7/25-7/29)

V. Measurement in Research

A. General considerations B. Types of validity and reliability C. Response sets	Ch. 4 ETS: Tests and Measurement Kit (all pamphlets) Test Service Bull. #50 Test Service Notebook #13, #27

VI. Types of Research

A. Historical B. Descriptive	Ch. 9 and 12; Final report on Cooperative Research Project No. S-334

(Week of 8/1-8/5)

VI. Types of Research (continued)

C. Experimental D. Action	Ch. 8,13,14; Final reports on Cooperative Research Projects #1750 and #S-028

VII. Methods of Research

A. Observation B. Rating scale C. Interview D. Questionnaire	Ch. 10,11

(Week of 8/8-8/12)

VII. Methods of Research (continued)

E. Test (projective and non-projective) F. Sociometric measures G. Case study H. Experimental measures	Ch. 5

VIII. Data-processing and Organizing

A. Processing the data B. Organizing the data	Ch. 6,7,16,17 Selected research articles and project reports

Methods and Instruments of Research (cont'd)

(Week of 8/15-8/19)

IX. Data-reporting

A. Interpreting the data	Ch. 17 and selected research articles and project reports
B. Writing the research report	
C. Publication of papers	

X. Educational Research - Present and Future

A. Research careers in education	Ch. 18; various state and federal publications; programs of AERA, APA and other organizations
B. Sources of support for educational research	
C. Frontiers of educational research	

Weekly seminars and individual conferences will be held to discuss your projects.

The following speakers will lecture on research methods and operations as they relate to the Junior College:

Dr. Ralph Walter, Chairman of Education Department, Montclair State College, Montclair, New Jersey

Dr. Elbert K. Fretwell, Jr., Dean for Academic Development, The City University of New York

Dr. Dorothy Knoell, Director, Urban College Study, State University of New York

Dr. Walter E. Sindlinger, Professor of Education, Teachers College, Columbia University; and Executive Officer, Center for Community College Administration

Dr. Abraham Tauber, Dean of Faculty, Bronx Community College of the City University of New York

Field trips will be made to:

Educational Testing Service, Princeton, New Jersey
IBM, New York City

Rockland Community College
of the State University of New York

Research Training Institute for Junior College Personnel

Dr. Irvin Hochman
Program Director

Dr. Gerhard Lang
Principal Instructor
and Consultant

Statistics for Educational Research

Text: George A. Ferguson *Statistical Analysis in Psychology and Education.* (2nd ed.) New York: McGraw-Hill, 1966.

Topic	Assignments
(Week of 7/11-7/15)	
I. Orientation	
A. Scope of statistics	Ch. 1 Ex. 1,2,6
B. Symbols and terminology	
C. Nature of measurement	
D. Use of calculating machines	
(Week of 7/18-7/22)	
II. Organization and Presentation of Statistical Data	
A. Frequency distribution	Ch. 2 Ex. 1-7 and other data
B. Tabular presentations	
C. Graphical presentation of data Cumulative frequency polygon Cumulative percentage polygon	
III. Measures of Central Tendency	
A. Arithmetic mean	Ch. 3 Ex. 2,4,6,8 (for data in Ex. 2 only)
B. Median	
C. Mode	
(Week of 7/25-7/29)	
IV. Measures of Variability	
A. Range	Ch. 4 (delete sections 4.3, 4.10, 4.12, 4.14, 4.15) Ex. 4 (mean, std. dev. only); 8,10
B. Standard deviation	
C. Semi-interquartile range	

Statistics for Educational Research (cont'd)

V. Measures of Relative Position

A. Percentiles (points and ranks)	Ch. 16 (sections 16.3 and 16.5 only) Ex. (special data)
B. Standard scores	Ch. 4 (section 4.12) Test Service Bull. #48 Ex. 9 and 12

(Week of 8/1-8/5)

VI. Probability, Binomial Distribution, Normal Curve

A. Probability	Ch. 5 Ex. 1-5,13
B. Binomial distribution	Ch. 5 Ex. 17,18
C. Normal curve	Ch. 6 Ex. 3-10; also other data

VII. Measures of Relationship

A. Product-moment correlation	Ch. 7 (delete sections 7.3 and 7.6) Ex. 6 and other data

(Week of 8/8-8/12)

VII. Measures of Relationship (continued)

B. Regression and prediction	Ch. 8 Ex. 2,4
C. Rank-difference correlation	Ch. 14 (sections 14.1-14.4 only Ex. 1,2
D. Chi square	Ch. 13 (delete section 13.7) Ex. 1,4,5,6

(Week of 8/15-8/19)

VIII. Tests of Significance: Means	Ch. 11 Ex. 1-4
IX. Analysis of Variance	Ch. 18 Ex. 2,3

Quizzes will be given periodically to help you determine the rate of your progress.

Quiz No.	Units covered
1	I - III.D
2	I - IV.C
3	I - V.A
4	IV - VI.C
5	VII.A
6	VII.C
7	I - VII.D

The pre-test and post-test cover Units I - IX.

Dr. Gerhard Lang

Format of the Proposal for a Research Project

This statement should be made in duplicate. One copy is for the instructor, the other for the student.

Head your proposal as follows:

Name Draft No.

Section Date submitted

The plan for the project should be presented in detail under the following headings:

1. Title

   State the tentative title of your proposal. Make it specific, concise, and distinctive.

2. Scope and purpose of the study

   Present the specific project in its general setting as it is related to broader problems in the area. Make explicit the purpose(s) of the study.

3. Related research

   Review critically the research related to the study.

4. Operational definitions

   Clearly define the key concepts, terms or expressions which have a special meaning in the study.

5. Assumptions

   Make explicit the assumptions (generalizations taken for granted) underlying various phases of the study.

6. Hypothesis(es) or Question(s)

   Clearly state the hypothesis(es) or question(s) to be investigated.

7. Method

   State clearly and fully the methods to be used in gathering data to answer the question(s) or to test the hypothesis(es).

   (a) Indicate the kinds of subjects or the sources (textbooks, journals, case studies, original documents).

   (b) Indicate the techniques to be employed (interview, questionnaire, tests, drawings, observations, analysis of published evidence, etc.).

Format of the Proposal (continued)

7. Method (continued)

   (c) Enumerate the specific data to be obtained from the method(s) described.

   (d) Indicate all research steps in the order in which they are to be carried out.

   (e) Propose and set forth in detail appropriate methods of handling the data.

8. Conclusions, Generalizations, and Educational Implications

   (a) State the probable findings or conclusions.

   (b) Indicate to what extent the generalizations or findings may apply beyond the data.

   (c) What are the implications of the study?

   (d) What are the limitations of the study?

   (e) Offer suggestions for further research.

Dr. Gerhard Lang

A Checklist for Evaluating a Research Report

I. Title

A. Is the title concisely stated?
B. Does the title convey the content of the study?

II. Statement of the Problem

A. Is the problem significant?
B. Is the problem clearly and completely formulated?
C. Is the general scope or setting of the study adequately presented?
D. Is the purpose of the study precisely stated?

III. Related Research

A. Is previous research related to the study presented by the investigator?
B. How relevant is the cited research to the study presented?
C. Is the previous research integrated or merely enumerated?

IV. Operational Definitions

A. Are key concepts or terms clearly defined or explained?
B. Are the definitions or explanations meaningful?

V. Assumptions

A. Are the assumptions underlying the study made explicit?
B. Are these assumptions reasonable?
C. What are other implicit assumptions of the study which should have been made explicit?

VI. Hypotheses or Questions

A. Are the hypotheses to be tested or the questions to be answered clearly stated?
B. Are the hypotheses stated in a form that permits them to be tested?
C. Are the hypotheses or questions superficial?

VII. Methods and Procedures

A. Are the characteristics of the sample (size, source, nature, etc.) selected fully presented?
B. Are the techniques employed (e.g., interview, questionnaire, apparatus, tests, etc.) clearly and fully described?
C. Are the instruments or techniques appropriate for collecting the data?
D. If tests were used, what evidence is presented regarding their rationale, reliability, and validity?
E. Is the design or procedure clearly and fully reported?
F. Is the statistical treatment of data discussed?
G. Are appropriate statistical methods used in analyzing the data?
H. Can the study be replicated?

VIII. Results and Discussion

A. Are the findings intelligibly presented?
B. Are the findings discussed adequately and meaningfully?

IX. Conclusions and Implications

A. Are the conclusions logically drawn, i.e., based on the data presented?
B. Does the investigator indicate the possible implications of his study?
C. Are these implications meaningful?

X. Limitations

A. Are limitations of the study recognized?
B. How severe are the limitations of the study?
C. What are some other limitations which were not mentioned?

XI. Suggestions for Further Research

A. Are any suggestions offered regarding avenues for further research?
B. Are these suggestions worthwhile?
C. What other suggestions should have been offered?

XII. Communication

A. Is the report well organized?
B. Is the report well written?

Dr. Gerhard Lang

Evaluation Form of a Proposal of a Research Study

A. Title

___missing

___ambiguous

___too long, make it more concise

___misleading

___not informative enough

___inappropriate to study proposed

___title is acceptable

B. Problem

___statement of problem is missing

___statement of problem is incomplete

___problem is trivial, insignificant, not worthwhile doing

___too complex, needs to be delimited

___rationale for study is missing

___rationale for study is inadequately presented

___problem is incoherently presented

___assumptions implicit in study hav not been recognized

___assumptions implicit in study a not justifiable

___limitations have not been stated

___rationale for study is irrelevant

___theoretical framework for study i missing

___statement of problem is acceptable

C. Purpose

___purpose stated is irrelevant to study

___statement of purpose is missing

___state purpose more clearly

___purpose is too ambitious for the kind of research you are able to do

___state purpose more concisely

___purpose of study is well stated

D. Related Research

___past research is missing

___insufficient coverage of the literature; important studies had not been cited

___research studies which are cited seem to be irrelevant to study

___insufficient information is presented regarding studies cited, e.g., purpose? design? findings? conclusions? limitations?

___research studies are merely listed, not critically evaluated, i.e., strengths and weaknesses are not pointed out

D. Related Research (continued)

___relationship between related research and proposal is inadequately shown

___references are too dated; recent, relevant studies are insufficiently represented

___certain statements and/or studies are not documented

___survey of past research is acceptable at this time; however, pertinent studies should be incorporated if the study should serve as a seminar paper or a master's thesis

E. Operational Definitions

___key terms and/or concepts are not defined, e.g.,

___key terms and/or concepts are inadequately defined, e.g.,

___operational definitions are acceptable

F. Hypothesis(es) or Question(s)

___hypothesis (question) is missing

___hypothesis (question) is not testable (cannot be answered)

___hypothesis (question) is poorly stated

___hypothesis (question) is acceptable

___hypothesis (question) is superficial

___hypothesis (question) not related to the theoretical framework that is developed in the statement of the problem

G. Sample

___sampling method is inadequate

___sample is too small

___proposed sample ought to be supplemented, e.g.,

___sample is acceptable

___description of sample is incomplete

___source of sampling (i.e., nature of population) not reported

H. Instruments

___instruments insufficiently described

___rationale for use of instruments not given

___rationale for using proposed instruments is unacceptable

___questionnaire items are inappropriate

___questionnaire is poorly constructed

___sample cover letter is missing

Form of Proposal (continued)

H. Instruments (continued)

___sample cover letter is poorly written

___evidence regarding validity and/or reliability of tests proposed is missing

___poor choice of instruments or techniques consider using...

___no provision is made for pre-testing newly developed devices

___instrumentation is acceptable

J. Research Design

___is missing

___unworkable because....

___inefficient because....

___inadequate because....

___sources of errors not controlled

___several research steps are missing

___indicate all research steps in the order in which they are to be carried out

___pilot study is called for

___design is acceptable

K. Analysis of Data

___statistical methods proposed for testing each hypothesis (or to answer each question) is missing

___statistical methods proposed are inappropriate

___statistical treatment proposed is stated incompletely

___criterion of significance is not stated

___analysis of data is acceptable

L. Writing Quality

___there are too many errors in grammar, rhetoric, syntax, etc.

___there are too many typing errors; proof-read your paper prior to submission

___immature writing style

___writing is too opinionated and biased

___writing quality is acceptable

Form of Proposal (continued)

M. Organization

___proposal is badly presented; it does not adhere to recommendations with respect to format, style, and content

___proposal well organized

N. Action taken on proposal

___proposal needs to be revised as indicated on your draft and discussed in seminar and/or individual conference

___proposal is acceptable; go ahead and conduct your study after obtaining appropriate approvals

APPENDIX D

Summary of Programs at Site Visits

1. Visit to Educational Testing Service
2. Visit to Abacus Associates
3. Visit to IBM
4. Visit to Exhibit of Educational Technology at American Management Association's Conference Dealing with "Educational Realities"

Summary of Programs at Site Visits

1 - Visit to Educational Testing Service

Trainees travelled to the Educational Testing Service on July 27, 1966, the program getting way in the mid-morning. Following coffee and introductions, Miss Frances Ottobre, Professional Associate, Evaluation and Advisory Service, presented a film which described the work of ETS.

Mr. Robert Linn, Associate Research Psychologists, Development Research, presented an example of institutional research involving an in-process study of the performance of an entire entering class of Bronx Community College. A number of new predictive test batteries were presented, followed by active discussion on the part of the trainees.

Mr. Eldon Park, Associate Program Director, Research Program for Higher Education, described and discussed the Institutional Research Program for Higher Education, IRPHE program of ETS, including some of their new instruments, the College Student Questionnaire (CSQ) and the College University Environment Scales (CUES). There was a marked interest in these and trainees were graciously supplied with additional materials and manuals related to their administration.

Following lunch there was a tour of ETS, conducted by Mrs. Kathleen Helmer, Professional Assistant, where the data processing operations were explained in considerable detail.

Mr. Dean Seibel, Director of Field Studies, then described some of the typical field studies conducted by ETS, dealing particularly with a national study of the characteristics of junior and 4-year college entrants and a national study of testing practices in junior colleges. This lead into a general discussion of needs in junior colleges in which the trainees questioned Mr. Seibel, Mr. Linn, and Mr. Park. Dr. John Helmick, Vice President of ETS, participated in the discussion. The interest in junior colleges is great at ETS and the impression gained was that many new programs and developments can be anticipated.

2 - Visit to Abacus Associates

Trainees spent the afternoon of August 4, 1966, at the offices and data processing center of Abacus Associates. Mendl Hoffman, the President, spoke to the group about data processing and computers, covering rapidly but most informatively the following areas:

(1) history of data processing; (2) types of machines; (3) manufacturers; (4) costs and rentals; (5) sub-types of machines; (6) the "generations" of machines; (7) the effective usage of computers and other data processing machines, including quantification of data, coding procedures, and economies; (8) procedures and programming, with examples from the social sciences; (9) types of statistical routines that can be handled by the computer, including time and cost factors.

Mr. Hoffman dealt frankly with the limitations of data processing. Types of problems encountered in the processing of data and communications problems between the researcher, statistician, and the computer programer were discussed.

Operations of a large number of data processing machines followed, with Mr. Hoffman demonstrating a number of sample programs which were then processed by the machines. The speed of operation, the wide range of capabilities, and the "talking-back" of the machines were a source of amazement to the trainees, most of whom had had little experience with data processing and computers.

3 - Visit to IBM

Trainees visited the New York City offices and Computer Center of the IBM Corporation on the morning of August 11, 1966. A representative of IBM presented a strip-film dealing with the use of computers for the solution of scientific and engineering problems. He accompanied the film with a prepared script, stopping to answer trainee questions. The basic materials of the film were excellent, but the mathematical and engineering applications were not too related to most of the trainees' interests. However, the representative was most helpful in bridging this gap, since he provided detailed information about computer costs, installations, and sharing arrangements. The availability of help from the IBM's Educational Department was also explained.

A second film presentation and discussion dealing with the College and University Procedure (UCIS) followed. This application of a modular central data bank which was capable of supplying "instant" and "private" information on a wide variety of stored records dealing with students, alumni college programs, and curricula was of considerable interest to the trainees. Other information was provided regarding the application of computers to the solution of various statistical problems, mathematical sub-routines, project scheduling, critical path and performance analysis, etc.

Demonstrations of various types of computers, including computer assisted instruction then followed.

4 - Visit to Exhibit of Educational Technology at American Management Association's Conference Dealing with "Educational Realities"

On the same day that the group visited the IBM Corporation on August 11, 1966, they also visited a comprehensive exhibit of educational soft and hardware presented under the auspices of the American Management Association's Second International Conference and Exhibit on Educational Technology.

Major manufacturers displayed a wide variety of the latest training machines and materials, including films, instructional TV, computer-assisted instruction, programed instruction, audio-visual material, etc. Trainees interested in innovations and research studies involving non-traditional approaches had an opportunity to discuss their interests with manufacturer representatives.

APPENDIX E

Summaries of Talks by Guest Speakers

1. Dr. Ralph Walter
2. Dr. Elbert K. Fretwell
3. Dr. Dorothy Knoell
4. Dr. Walter Sindlinger
5. Dr. Abraham Tauber

Summaries of Talks by Guest Speakers

at the Research Training Institute

Speaker 1 - Dr. Ralph Walter

Dr. Walter discussed three types of research which he called (1) basic research, (2) local research, and (3) experimental research. Basic research would be typified by broad basic research studies such as the Harvard Growth Study. Local research, which could be conducted by an individual or an institution. In this existing data is compiled, organized, and analyzed. Also, newly created data could be analyzed which obviates institutions operating on the basis of hunches and guesses. And finally, experimental research, which is different than mere innovation. There must be an evaluation component built into it.

The purposes of research were to offer a basis for decision making, to determine how effective a college is, to evaluate current practices and a means of keeping professionally fit. Dr. Walter illustrated these points by many pertinent examples.

Dr. Walter also described many different patterns of organization for conducting research studies, ranging from formal research bureaus, ad hoc groups, etc., to individual studies. The permutations and scope of possible research studies, he indicated, were really endless.

He concluded by discussing areas that require study in colleges, such as admission policies, grading and marking systems, consultation and counseling of students, student and faculty attitudes and relationships, etc.

Speaker 2 - Dr. Elbert K. Fretwell

Dr. Fretwell outlined five areas in which research is needed: I - needs of society and employer, II - nature and needs of student population, III - the academic program, IV - the administrative structure, and V - outcomes.

Dr. Fretwell raised a number of provoking questions about junior colleges with respect to I - V above and discussed these with the trainees. Some of these questions were:

I - 1. What "product" will we need in 1980? 2,000?
2. What skills should he possess?
3. What is the high school likely to have provided?
4. What are the future job needs that the junior college must supply?
5. Who else will meet these job needs?

II - 1. Who is our college serving now?
2. How well is the college doing for its students?
3. Who should be served by the institution? Finances involved?
4. What is our district or constituency likely to look like?

III - 1. How are the students different at the end from the beginning?
2. How active are the students involved in learning?
3. Are there programs and practices in the college that are particularly effective?
4. What new programs are needed? E.g., a mental health program?
5. What methods are there for simulating a trial run?
6. How can courses be improved?

IV - 1. How can the caliber of the faculty be improved?
2. Do administrative practices help or hinder the faculty?
3. What is the optimum size of a campus?
4. What about branching and the degree of autonomy of branches?
5. How many courses should a student take? What is the optimum time for a course and a program?
6. Optimum relations between units in a state-wide and city-wide system? Responsibility for planning?
7. Pre-planned courses vs. individual development of course.
8. Who gets what services? Central provisions vs. individual.

V - 1. How clear are the goals of the institution? Suggestions for "image studies" of community perceptions.
2. How well do graduates do? Do graduates fit the folklore of junior college students?
3. How successful are the college's non-graduates?
4. Ways of using students in evaluating the institution.
5. Evaluation of evaluations? Do they make the institution better? The role of the outsider vs. the insider. The former is often better.

Speaker 3 - Dr. Dorothy Knoell

Dr. Knoell gave a very practical talk dealing with "things a researcher should know about research activities."

She sketched in the tremendous growth in higher education, the "new" student presently attending college and the "new" students who might be expected in the future.

Pointing out the tremendous need for research data and information, she discussed research as a faculty activity with emphasis upon institutional problems, rather than more highly specialized scholarly endeavors. She described faculty "types" who engage in, assist, promote, or retard research efforts.

While stressing the satisfactions and values of engaging in research activities, she pointed out certain "paradoxes" she has observed:

(a) We seemingly refuse to learn from one another.
(b) Each college seems to have to learn for itself, - this is true even within the same department.
(c) Many innovative techniques and research topics have been researched to death, have been found to be effective, yet are not utilized. For example, educational T.V., admissions studies, etc.
(d) The Office of Education and foundations' constant search for something new.
(e) It is possibly easier to do research than to write proposals.

She spoke of ways to elicit local community and industry support of research activities, the advantages of revolving research funds.

The difficulties in communicating research findings were noted. The clear definition of the problem or question is often more important than the statistical treatment of the data. Often the researcher cannot communicate what he is trying to find out to the statistician or to the data processing programmer. The hardest work in research is in designing of adequate instruments that really identify the pressing problems.

Speaker 4 - Dr. Walter Sindlinger

After referring to the tremendous growth of junior colleges, Dr. Sindlinger discussed the important place of institutional research. He believed that such activities should be clearly identified within the college organization; every junior college should have an institutional research office.

He discussed many kinds of research activities and the organization of research using a framework developed by Dr. Lewis Mayhew of Stanford University. He warned against research designed to perpetuate certain folk-lore and cliches about junior colleges, including research which is performed often so that others do not have to do it for us, with results not to our liking.

Dr. Sindlinger, referred to business and industry as doing research, not out of charitable impulses, but because it did indeed pay off. He asked for research to improve our teaching methods, pointing out a drift towards conformity. This conformity grows out of a defensive attitude part of the new community colleges to prove their worth to the older institutions. There is a drive towards respectability and inability to really define the needs of its students. With this lack of needed information, junior colleges have tended to adopt the familiar and traditional, often without consideration of the educational goals of the institution and the students who come in, many through the "open door." And what about students who do not apply? There has been, he believed, a failure to recognize and to take into account institutional climate, these "symptoms" of what is happening on the campus. The community itself may not know what it needs.

Throughout his talk, Dr. Sindlinger stressed the importance of research to come up with more objective information about an unique institution of higher learning, the junior college.

Speaker 5 - Dr. Abraham Tauber

Dr. Tauber spoke of research from the point of view of an administrator (Dean of Faculty and Acting President) of a large metropolitan community college. He commented on the shortage of research specialists, budgetary support, jurisdiction and location of research personnel, resistance of faculty, etc. The importance of central office support of research activities, of communicating purposes of studies and their results to staff, and the working on problems of interest to the faculty were noted. Engaging in research becomes a "pleasant infection."

Dr. Tauber gave a review of some of the more important research studies related to junior colleges (Medsker, L. Johnson, etc.). He referred to the Bronx Community College's role as an "island of innovation," citing a number of their many pioneering innovations and the research efforts. He urged similar efforts be made elsewhere.

Research was characterized as an application of intelligence, best effort, and scrutiny, as an ongoing process, not as a panacea. Implicit in his presentation was a perception of research as exercise in straight thinking and effective communication. The great value of research findings to the administrator was emphasized. Research is also of value in that it may change certain faculty attitudes based on faulty premises and beliefs.

APPENDIX F

Instruments for Evaluating Trainees' Progress

1. Achievement Test on Statistics
2. Achievement Test on Methods and Instruments of Research
3. Calculating Machine Proficiency Test
4. Institute Participant Questionnaire - Form A
5. Mid-program Reactionnaire
6. End-of-Program Questionnaire - Form B

Form S-1

ACHIEVEMENT TEST IN STATISTICS

Part I (75 credits)

Select the one best alternative which correctly completes each statement. Your score is the number of questions answered correctly. Place your answers on the answer sheet.

DO NOT MARK UP THE QUESTION SHEETS.

1. The most easily obtained measure of the variability within a set of scores is the

   (1) standard deviation
   (2) quartile deviation
   (3) range
   (4) mean deviation

2. If one should obtain a correlation coefficient of .87 between two reading tests, one of comprehension and the other of speed, one may conclude that

   (1) they share a common relationship to causative variables
   (2) fast readers understand more than slow readers
   (3) low comprehension is caused by low speed of reading
   (4) high comprehension is caused by rapid speed of reading

3. The postulate that no true difference exists between the populations from which two samples are drawn is known as the

   (1) probability theory
   (2) Galton hypothesis
   (3) null hypothesis
   (4) Gaussian theory

4. The measure of central tendency defined as the sum of the separate scores divided by their number is known as the

   (1) median
   (2) mid-score
   (3) mean
   (4) mode

5. For which one of the following problems would the chi-square statistic be inappropriate?

   (1) to test the homogeneity of two or more frequency distributions
   (2) to test the agreement between a theoretical and an observed distribution
   (3) to test the effectiveness of a set of classification principles
   (4) to test the significance of the mean of the dependent variable in a simple regression equation

6. A quantitative non-technical method of showing the relationship of test scores to job success is the

   (1) ogive curve
   (2) expectancy table
   (3) time-and-motion study
   (4) scatter diagram

7. A measure of goodness of fit which tests whether or not a table of observed frequencies "fits" or is consistent with a corresponding set of theoretical frequencies conforming to a given hypothesis is

(1) sigma
(2) rho
(3) z score
(4) chi-square

8. An investigator obtained a correlation coefficient of .55 between a standardized group test of mental ability and four-year honor point index for a large random sample of seniors in a given high school. Approximately how much of the variance of the honor point index can be accounted for by using the mental ability test scores?

(1) 5.5%
(2) 30.0%
(3) 45.0%
(4) 55.0%

9. Which of the following would be the most appropriate statistic to use in terms of cost and efficiency in order to compare by ages the distributions of heights of New York City school children with the distributions of heights of school children reported in the last U. S. census?

(1) chi-square
(2) analysis of variance
(3) correlation coefficient
(4) t-test

10. Chi-square is the appropriate correlational method to use when

(1) variable X is continuous and variable Y is discrete
(2) variable Y is continuous and variable X is discrete
(3) both variables X and Y are continuous
(4) both variables X and Y are discrete

11. Analysis of variance is used to test the significance of the

(1) size of a given sample
(2) differences between the means of a number of different samples
(3) differences between observed and expected frequencies
(4) size of a given population

12. A coefficient of contingency may be derived directly from data utilized to compute

(1) chi-square values
(2) z values
(3) regression equations
(4) F values

13. The correct use of the biserial correlation coefficient as an estimate of "rho" involves the following assumption:

(1) one of the variables is continuously and normally distributed and the other is a true dichotomy
(2) both the underlying variables are continuously and normally distributed
(3) the sampling distribution of biserial "r" is known and is independent of the nature of the distributions of the variables
(4) both variables are true dichotomies, hence they represent discrete data

14. The process of breaking up the total sum of squares of deviations of the observations from a grand mean into independent portions assigned to certain factors is called

(1) factor analysis	(3) analysis of variance
(2) the correlation ratio	(4) multi-variate analysis

15. In a frequency distribution curve the abscissa represents the

(1) number of cases	(3) tallies
(2) scores	(4) subjects

16. In a normal distribution curve, what per cent of the cases fall below minus one sigma?

(1) 68	(3) 95
(2) 34	(4) 16

17. A frequency distribution may have more than one

(1) mean	(3) median
(2) mode	(4) standard deviation

18. A purpose of determining the central tendency in a group of scores is to

(1) find the variability	(3) measure the significance
(2) obtain the degree of skewness	(4) find the typical performance

19. The median is a score of

(1) range	(3) regression
(2) dispersion	(4) position

20. The most frequently appearing score in a distribution is the

(1) mean	(3) median
(2) standard deviation	(4) mode

21. When will 50 per cent of a group be below the median for the group?

(1) always, regardless of the distribution
(2) only when the distribution is skewed
(3) when the mean and median coincide
(4) when the distribution is large

22. In a skewed distribution

(1) the modal score occurs less frequently than the mean
(2) the mean is always less than the median
(3) departures from the typical score lie more frequently in one direction than in the other
(4) the mode and the median are identical

23. Which of the following is not a measure of variation?

(1) range
(2) standard deviation
(3) mean deviation
(4) coefficient of correlation

24. Within the limits marked off by one standard deviation on each side of the mean in a normal distribution, the per cent of scores is approximately

(1) 50
(2) 75
(3) 68
(4) 100

25. Jack has a percentile rank of 70 on a test. This means that

(1) he is at the median
(2) he is in the upper quarter
(3) he obtained 70 per cent of the answers correctly
(4) 30 per cent of the class did better than he

26. A standard score

(1) is synonymous in meaning to central tendency
(2) is based on some multiple of the standard deviation
(3) is easier to compute than the range
(4) means the same as centile

27. A person computes a correlation of +3.28. Which of the following statements is correct?

(1) There is a perfect relationship between the two tests.
(2) There is no relationship between the two tests.
(3) The person made a mistake.
(4) There is a high but not a perfect relationship.

28. Which of these correlation coefficients denotes the greatest degree of relationship?

(1) -1.00
(2) -.50
(3) +.75
(4) +.50

29. If the mean score of a final examination with an approximately normal distribution is 50 and the standard deviation is 10, the highest and lowest scores for a large group of students are probably

(1) 80 and 20
(2) 70 and 30
(3) 100 and 10
(4) 80 and 50

30. The correlation coefficient is a number that indicates

(1) the variability of each variable
(2) the relation between the mean and the spread of a distribution
(3) the extent to which you can predict an individual's score on a second test if you know the mean of the first test
(4) a degree of relationship between two variables

31. A critical ratio of 2.0 can be reached by chance

(1) only 2 in 100 times
(2) 80 in 100 times
(3) only 5 in 100 times
(4) 90 per cent of the time

32. The higher the coefficient of correlation between any two variables,

(1) the greater the standard error of estimate
(2) the higher the predictive efficiency
(3) the more certain we can be that one variable causes the other
(4) the more certain we can be that a representative sample was used

33. Which of the following can be called a descriptive statistic?

(1) confidence limits
(2) the significance of a mean difference
(3) the standard deviation of a distribution
(4) the critical ratio of r

34. In a symmetrical distribution

(1) the standard deviation is small
(2) the standard deviation is large
(3) the mode, median, and mean are the same
(4) the range is large

35. Finite, random, fixed, and mixed models are terms associated with

(1) correlational analyses
(2) factor analysis
(3) analysis of variance
(4) measurement theory

36. When we classify raw data according to size and present them in tabular form, we have

(1) a normal curve
(2) measures of variation
(3) a symmetrical distribution
(4) a frequency distribution

37. The most useful measure of variation is the

(1) standard deviation
(2) normal distribution
(3) critical ratio
(4) coefficient of correlation

38. The standard error of the mean

(1) decreases with increase in the number of cases
(2) increases with increase in the number of cases
(3) is a measure of score variability around the true mean
(4) is relatively independent of the sample size

39. Mr. Larson made a score of 60 on a test, the mean of which was 50, the standar deviation 10. On a second test, he made a score of 80, the mean of which was 70 and the standard deviation 10. Which of the following is correct?

(1) He did better on the first test.
(2) He did better on the second test.
(3) The standard deviation should be larger on the second test.
(4) He did equally well on both tests.

An experiment was conducted with three groups of students: Control group 1 (N = 39), Control group 2 (N = 32), Experimental group (N = 53). Prior to the start of the experiment, students in all groups were given a series of five pre-tests to determine whether the three groups were initially equivalent in their performance on these five tests. The following F ratios were obtained:

Pre-test	F ratio
A	0.73
B	2.67
C	2.50
D	1.50
E	1.89

Consult Table D and then decide whether the data indicate that the three groups are:

(1) equivalent
(3) somewhat equivalent
(2) not equivalent
(4) performing below expectancy.

40. The F ratio for Pre-test A indicates that the three groups are:
(Select either alternative 1, 2, 3, or 4 from above)

41. The F ratio for Pre-test B indicates that the three groups are:

42. The F ratio for Pre-test C indicates that the three groups are:

43. The F ratio for Pre-test D indicates that the three groups are:

44. The F ratio for Pre-test E indicates that the three groups are:

The following data were reported for a class which had taken Form A of a standardized reading test. (Questions 45-48)

Mean	38.5	Q_3	42.1
Standard Deviation	5.3	Median	38.3
		Q_1	34.4

45. From the above data, between what two score values will you expect the middle two thirds of the group to fall?

(1) Between 34.4 and 42.1
(3) Between 38.5 and 5.3
(2) Between 33.2 and 43.8
(4) Between 38.5 and 38.3

46. From the above data, what can we say about the score that a person will probably make on Form B of the test, if he made a score of 50 on this form?

(1) He will probably score above 50 on a parallel form.
(2) He will probably score just about 50 on a parallel form.
(3) He will probably score below 50 on a parallel form.
(4) No estimate of his score on a parallel form is possible from the information given.

47. What interpretation can we give to an individual's score of 43 from the above data?

(1) It is a score surpassed by about 75% of the group.
(2) It falls near the upper quartile.
(3) It represents better achievement than could be expected for that individual.
(4) No interpretation is possible from the information given.

48. What statement can we make about the shape of the distribution of scores on this test?

(1) It appears to be approximately symmetrical.
(2) It appears to have marked positive skewness.
(3) It appears to have very little kurtosis.
(4) No statement is possible from the information given.

A 50-item test was given to a class, and yielded the following distribution of scores. (Questions 49-58 refer to this distribution.)

Distribution of Scores

Score Interval	f	x'	fx'	f(x')^2	Cumulative Frequency
49 - 50	6	3	18	54	81
47 - 48	11	2	22	44	75
45 - 46	16	1	16	16	64
43 - 44	18	0	0	0	48
41 - 42	6	-1	-6	6	30
39 - 40	9	-2	-18	36	24
37 - 38	4	-3	-12	36	15
35 - 36	2	-4	-8	32	11
33 - 34	4	-5	-20	100	9
31 - 32	5	-6	-30	180	5
Totals	81		-38	504	

49. In the above tabulation, the arbitrary origin is

(1) 43
(2) 43.5
(3) 44
(4) 44.5

50. In the above score distribution the median is approximately

(1) 40.5
(2) 42
(3) 44
(4) 50

51. In the above score distribution the class interval is

(1) 2
(2) -38
(3) 31 to 50
(4) 81

52. What is the mode in the above frequency distribution?

(1) Between 16 and 18
(2) 18
(3) 43-44
(4) 44.5

53. The test which gave this distribution of scores appears to be

(1) somewhat too easy to be an efficient measuring device for this group
(2) of just about the right difficulty for this group
(3) somewhat too difficult to be an efficient measuring device for this group

54. Which of the following would be the best measure of variability in the group?

(1) Range of scores
(2) Standard deviation
(3) Second quartile minus first quartile divided by 2
(4) Semi-interquartile range

55. Mary who got a score of 38 falls closest to the

(1) 20th percentile
(2) 30th percentile
(3) 40th percentile
(4) 75th percentile

56. Three consecutive steps in computing the mean are shown below. A major error has been introduced into one step. Mark on the answer sheet the step which contains the error.

(1) $\frac{-38}{81} = -.47$
(2) $2(-.47) = -.94$
(3) $42.5 + .94 = 43.44$

57. Four consecutive steps in computing the standard deviation are shown below. A major error has been introduced into one step. Mark on the answer sheet the step which contains the error.

(1) $\frac{504}{81} = 6.22$
(2) $6.22 + \left(\frac{38}{81}\right)^2 = 6.46$
(3) $\sqrt{6.46} = 2.54$
(4) $2(2.54) = 5.08$

58. Four consecutive steps in computing the 80th percentile are shown below. A major error has been introduced in one step. Mark on the answer sheet the step which contains the error.

(1) 80% of 81
(2) $\frac{64.8 - 64}{11} = \frac{0.8}{11} = 0.07$
(3) $2(0.07) = 0.14$
(4) $44.5 + 0.14 = 44.64$

59. When the results of an experiment are statistically *not significant* they

(1) have no practical application
(2) are scientifically meaningless
(3) may be attributed to chance
(4) are a result of an error

60. The value of t at the 5% level of significance depends upon

(1) the degrees of freedom
(2) the F value
(3) the nature of research conducted
(4) the size of the population means

61. On four consecutive rolls of a dice a "6" is obtained. The probability of obtaining a "6" on the fifth roll is

(1) 1
(2) 5/6
(3) 1/6
(4) 1/2

62. A graph that represents frequency of scores by the height of a bar is called a

(1) bell-shaped curve
(2) histogram
(3) frequency polygon
(4) chance distribution

63. Which of the following is most affected by extreme scores?

(1) mode
(2) mean
(3) median
(4) all are affected equally

64. When the null hypothesis is rejected it means that the obtained difference between two samples

(1) is due to chance
(2) cannot reasonably be attributed to chance
(3) reflects a true difference
(4) is repeatable

65. If the standard deviation of a distribution of IQ scores in a representative sample of high school students was significantly larger than the standard deviation of a representative sample of college students, it would indicate that the IQ's of high school students tend to be

(1) lower than those of college students
(2) higher than those of college students
(3) more widely dispersed around their mean than those of college students
(4) less variable than the IQ's of college students

66. If a series of samples of 100 cases each were drawn at random from a large population, the means of these samples would

(1) be normally distributed
(2) form a rectangular distribution
(3) be practically identical
(4) form a distribution with a standard deviation of one

67. If you knew that the scores on a certain test were normally distributed and that a friend had a score on that test that was two deviations above the mean, you could be sure that

(1) most people scored above your friend
(2) most people scored below your friend
(3) his score was very close to average
(4) you have no way of determining his relative standing

68. When it is established that an obtained difference is statistically significant, it can be said that

(1) the null hypothesis has been confirmed
(2) there is no true difference in the population from which the sample was drawn
(3) the sample difference is identical with the population difference
(4) the difference may not reasonably be attributed to sampling (chance) factors

69. Statistical treatment of data provides

(1) summary description of data
(2) a technique of inductive inference
(3) a method for generalizing from sample observation to a more general law
(4) all of the above

70. In rolling two dice, the probability of obtaining either a "7" or an "11" is

(1) 2/6
(2) 1/9
(3) 2/9
(4) 1/12

71. An interval scale does not have

(1) the property of being ordered
(2) the property of possessing equal intervals between whole numbers
(3) the properties of ratio measurement
(4) any of the above

72. In the normal distribution

(1) fifty per cent of the cases fall above the mean
(2) the median is the same value as the mean
(3) the cases are symmetrically distributed around the mean
(4) all of the above are true

73. A negative correlation between intelligence and grade point average would mean

(1) the higher the intelligence the higher the predicted grade
(2) no relation between grades and intelligence
(3) no matter what the intelligence, the best prediction is the average grade
(4) the lower the intelligence the higher the predicted grade

74. The statistic(s) appropriate to the ordinal scales of measurement is(are)

(1) mean, standard deviation, Pearson product moment correlation
(2) median, percentiles, rank-order correlation
(3) geometric mean and coefficient of variation
(4) multiple product-moment correlation

75. In order to transmute a given raw score into a standard score, it is necessary to know the

(1) median and standard error of the distribution
(2) mean and standard error of the distribution
(3) median and standard deviation of the distribution
(4) mean and standard deviation of the distribution

Part II (25 credits)

Pupil	Scores on Pre-test	Scores on Post-test
Edna	14	19
Judith	20	20
Kenneth	8	15
Bill	15	19
Joe	13	19
Jim	15	20
Lucy	13	18
Harry	14	20
Martha	18	25
John	10	16
Marie	14	18

A. For the Pre-test calculate: (1) Mean____________________

(2) Median__________________

(3) Mode____________________

(4) Standard deviation_______

B. Determine the degree of correlation between the pre-test and the post-test. You may, if needed, consult Table K.

Form R-1

ACHIEVEMENT TEST IN METHODS AND INSTRUMENTS OF RESEARCH

Part I (75 credits)

Select the one best alternative which correctly completes each statement. Your score is the number of questions answered correctly. Place your answers on the answer sheet.

DO NOT MARK UP THE QUESTION SHEETS.

1. The use of scientific research procedures in a given research project

(1) assures the production of reliable information
(2) is more likely to produce reliable information than other methods
(3) guarantees that the information yielded is relevant and unbiased
(4) assures that the answer to a given question is true or false

2. The selection of the topic for research is generally followed by

(1) the collection of data
(2) formulation of method of procedure
(3) the formulation of a specific problem
(4) designing the study

3. When each subject has the same chance as any other subject to be chosen for either the experimental or control group our selection is called

(1) randomization
(2) stratification
(3) biased
(4) scientific

4. A measurement procedure is said to be reliable when it

(1) gives consistent results
(2) yields information on the problem
(3) measures what it purports to measure
(4) is amenable to statistical analysis

5. In the collecting of data by observation

(1) personal attributes of the observers may well be decisive factors in the kind of data obtained
(2) care must be taken that purpose of study be hidden from those being studied
(3) the larger the sample the more valid the observation
(4) rating scales are always used

6. An increase in the accuracy of observation

(1) is obtained by practice
(2) is obtained by getting two observations of the same situation
(3) comes with awareness of one's biases of the situation being studied
(4) is obtained by a more intelligent person

7. Interviews and questionnaires as a data collection method

(1) are more effective than observational techniques
(2) reveal only information the subject is willing to report
(3) cannot be considered to have validity
(4) provide no information about past behavior

8. The well-known "Hawthorne" studies demonstrate that

(1) one can overlook an important variable
(2) relationships between physical conditions and output were as they expected them to be
(3) one can accept an established fact
(4) laboratory research is more reliable

9. The function of a hypothesis is to

(1) state the problem
(2) suggest an explanation for existing inquiry
(3) direct our search for the order among facts
(4) make the research scientific

10. The usage of an exploratory study in research design is particularly useful when

(1) many previous hypotheses have been developed in the area of intended research
(2) the researcher is interested in formulating problems for more precise investigations
(3) more information is needed to complete a descriptive study
(4) there is insufficient time to survey the relevant literature

11. The distinguishing characteristic of open-ended questions is that they

(1) suggest possible alternative answers to the problems stated
(2) have a biasing effect on the respondent's answers
(3) do not suggest any structure for the respondent's reply
(4) may encourage the respondent to formulate an opinion about an issue where the respondent really has no opinion

12. Information gathered for research must be

(1) readily available
(2) relevant to the question asked
(3) kept confidential
(4) amenable to quantification

13. Careful research procedures

(1) control all variables
(2) yield unbiased information
(3) eliminate errors of measurement
(4) insure the validity of the research problem

14. A research project requires

(1) an hypothesis
(2) formulation of a problem demanding solution
(3) a study of correlations
(4) a cross-section of the population

15. In order to conduct research, one must use concepts that are

(1) translatable into observable events
(2) related to available tests
(3) quantifiable
(4) related to a sound theory

16. The causal relationship between two variables can be established conclusively by

(1) a study of the extent to which two variables occur or vary together
(2) the time order of the occurrence of two variables
(3) a study of several possible determinants of the dependent variable
(4) none of these

17. Randomization and matching are both procedures designed to

(1) achieve a representative sampling
(2) directly test a causal hypothesis
(3) control extraneous variables
(4) demonstrate the time order of variables

18. When X stands for the independent variable in an experiment, one can assume that the control group

(1) will not be exposed to X
(2) will be exposed to X
(3) may or may not be exposed to X
(4) will alternately be exposed to X

19. A researcher plans to administer the New York Test of Mathematical Concepts to a group of third grade children in several schools in Darien, Conn. Before making a definite decision concerning the use of this test, it is most important for him to consider the test's

(1) difficulty for Darien pupils
(2) content validity for Darien pupils
(3) reliability for New York City pupils
(4) predictive validity for New York City pupils

20. Most self-reporting devices are subject to basic weakness in that they are accurate only to the degree that the individual's self-perceptions are accurate and to the degree that he is willing to express these honestly. This weakness is generally most serious in

(1) personality inventories
(2) vocational interest tests
(3) reading checklists
(4) sociometric measures

21. A researcher wishes to compare the effectiveness of two methods of teaching ninth grade algebra. Of the following, it is most important that the equivalent groups he plans to use be matched for

(1) sex
(2) intelligence
(3) algebraic aptitude
(4) previous achievement in arithmetic

22. Of the following, which procedure provides the most rigorous indication of the reliability of a test?

    (1) Administering an equivalent form of the test after a time interval of one month.
    (2) Administering the same form of the test after a time interval of one month.
    (3) Splitting the test into two halves, and using the Spearman-Brown formula.
    (4) Using the Kuder-Richardson formula to obtain a reliability coefficient.

23. A researcher is asked to participate in the development of a series of tests for use in selecting high school principals. The most difficult aspect of this assignment is

    (1) obtaining the participation of a group of subjects
    (2) constructing suitable tests for trial
    (3) identifying satisfactory criteria for job success
    (4) developing suitable indices of test validity and reliability

24. Which one of the following problems is best suited to study through the use of the "inbasket" technique?

    (1) Leadership ability of a group of school supervisors.
    (2) Ability of a group of principals to solve administrative problems.
    (3) Means of increasing participation of school board members in school administration.
    (4) Personality characteristics of successful and unsuccessful school supervisors.

25. The major function of the control group in an experimental study is to measure effect of

    (1) differences in difficulty of pre- and post-tests
    (2) external factors upon the dependent variable
    (3) interaction of group characteristics and experimental treatments
    (4) administration of a pre-test prior to application of the experimental treatment

26. The term "halo effect" refers to the tendency of an observer to permit an initial impression to influence his ratings of subsequent performance. The halo effect error is generally most serious when

    (1) specific behaviors are being rated
    (2) abstract qualities are being rated
    (3) the behavior being rated has occurred frequently
    (4) the behavior being rated has occurred infrequently

27. In a research study dealing with teacher effectiveness, a group of principals asked to rate their teachers on a series of behaviors. Some of the behavior characteristics to be rated occur relatively infrequently during the period of time covered by the study. In such instances, the principals will generally tend to

    (1) assign ratings at the high end of the scale to the teachers
    (2) assign ratings at the middle of the scale to the teachers
    (3) assign ratings at the low end of the scale to the teachers
    (4) spread their ratings throughout the range of the scale

28. A study of pupil interaction calls for observation of six classes over a six-month period. In studies such as this, observers tend to drift apart in their frames of reference concerning the behavior they are observing. In order to combat this tendency, the director of the study should

(1) change observers at approximately two-month intervals
(2) schedule occasional practice observations during the course of the study
(3) determine interobserver reliability at frequent intervals and drop observers who are deviating from the norm
(4) have observers submit joint rather than individual reports of observations

29. A pupil obtains a score of 65 on a standardized test in science. The standard error of the test is 4 points. What are the chances that the pupil's true score will fall between 61 and 69?

(1) About 1 chance out of 2.
(2) About 1 chance out of 3.
(3) About 2 chances out of 3.
(4) About 9 chances out of 10.

30. In order to arrive at definitive answers, it is important to use a large sample rather than a small sample in those instances where

(1) many uncontrolled variables are present
(2) large differences in the dependent variable are anticipated
(3) comparisons among subgroups is not part of the research design
(4) the population is relatively homogeneous on the variables being studied

31. Of the following, the most important determinant of the extent to which the results of a research study can be generalized is the

(1) nature of the sample used in the study
(2) adequacy of the instruments used to collect data
(3) degree to which the effects of extraneous variables have been controlled
(4) ease with which the research design can be replicated

32. Of the following, the most important reason for conducting an intensive review of the literature prior to embarking on a research study is that such a review will

(1) help the researcher avoid methodological problems
(2) provide the researcher with suggestions concerning needed research
(3) enable the researcher to broaden the scope of his problem
(4) suggest ways in which the researcher may present his data in his final report

33. Recent issues of the Education Index list articles and book references under

(1) both subject and author
(2) author only
(3) subject only
(4) subject for articles, author for books

34. In addition to carrying abstracts of articles appearing in psychological journals, Psychological Abstracts also contains abstracts of selected articles in

(1) general periodicals, such as Atlantic Monthly
(2) government periodicals, such as Higher Education
(3) "house organs," such as Steelways
(4) educational journals, such as the Journal of Experimental Education

35. Doctoral theses in education, completed and underway, are compiled on a yearly basis in

    (1) Dissertation Abstracts, published by University Microfilms
    (2) Research Studies in Education, published by Phi Delta Kappa
    (3) Review of Educational Research, published by the American Educational Research Association
    (4) Education Abstracts, published by the Educational Clearing House, UNESCO

36. In order to be considered acceptable, an hypothesis should

    (1) be stated in broad, general terms
    (2) be stated in negative terms
    (3) be amenable to evaluation by objective means
    (4) conflict with the preponderance of previously reported information

37. The relatively late development of the research approach in the field of education is largely attributable to a lack of

    (1) acceptance of educational innovations by the community
    (2) appropriate tools for the measurement of objectives
    (3) adequately trained school administrators
    (4) carefully defined problems for study

38. Educational research has been slow in developing a sound theoretical foundation because of

    (1) pressure of public school administrators to get immediate answers to practical classroom problems
    (2) inability to develop rigid controls of experimental conditions
    (3) failure to replicate important studies in communities differing in size and complexity
    (4) overemphasis upon laboratory research particularly in the field of learning

39. The most marked difference between "basic" and "applied" research in education is in the extent to which

    (1) control and precision are emphasized
    (2) the Hawthorne effect operates
    (3) implications are drawn concerning school practice
    (4) theoretical constructs are tested

40. Of the following, which definition of an "underachiever" is most suitable for selecting subjects for a research study? An underachiever is a pupil

    (1) whose achievement is less than would be expected from his aptitude
    (2) whose achievement test grade score is more than one year below his present grade placement
    (3) whose standard score on the Stanford Achievement Test is five or more points below his standard score on the Otis Intelligence Test
    (4) of high aptitude who is working well below his potential

41. Which one of the following constitutes the major difficulty in carrying out an observational study?

(1) Determining the reliability of observations.
(2) Quantifying obtained information.
(3) Recording ongoing observations.
(4) Defining the behaviors to be observed.

42. If 50 students from a group of 200 7th termers were to be studied by the Rorschach technique, the sample (50) would be considered random if

(1) there were the same number of boys and girls in the group of 50
(2) every boy and girl in the 7th term had an equal opportunity to be selected
(3) two students were selected whose names began with each of the 25 letters of the alphabet except X
(4) every IQ level (ex.: 80-85, 85-90, etc.) was equally represented by the 50 students

43. A summary of significant research on education of exceptional children done during any 3-year period since 1937 may be found in

(1) Education Index
(2) Review of Educational Research
(3) International Index
(4) Psychological Abstracts

44. Which of the following techniques assumes that people will reveal some of their unconscious feelings and attitudes?

(1) Sociometric study.
(2) Projective tests.
(3) Questionnaires
(4) Interviews.

45. A study of success achieved by college graduates 5 years after graduation is being made using a questionnaire in which the respondents are asked for a record of earned income since graduation. Implicit assumptions in the study are

(1) a period of 5 years is sufficient opportunity to achieve success
(2) annual income is a valid measure of success
(3) respondents will report income honestly
(4) all of these

46. The null hypothesis states that

(1) two means are significantly different from one another
(2) there is no difference between the means of 2 samples
(3) a difference as large as that obtained occurs only 5 in 100 times
(4) the sample mean is the best estimate of the population mean

47. The statistical methods to be used in a study should be determined

(1) before the hypotheses have been formulated
(2) as the study is being designed
(3) after the data have been collected
(4) after the data have been tabulated

48. The Spearman-Brown formula is frequently useful in test construction because it enables one to estimate

    (1) test validity
    (2) the variation of a given group from the standardization sample
    (3) the number of additional items needed to attain adequate reliability
    (4) the average difficulty level of a set of test items

49. The absence of personal insight contributes to the lack of validity of data obtained from

    (1) intelligence tests
    (2) self-report inventories
    (3) achievement tests
    (4) projective tests

50. A correlation between test scores with a subsequent criterion measure is called a measure of

    (1) concurrent validity
    (2) predictive validity
    (3) content validity
    (4) construct validity

51. Of the following, which is the most basic and essential requirement for a good questionnaire study? The

    (1) brevity of the questions and objectivity of required responses
    (2) prestige of the sponsoring organization
    (3) clarity of the questions
    (4) ability and willingness of the respondents to make reliable answers

52. With which of the following measurement devices is the technical noun "isolate" most frequently associated?

    (1) sociometric techniques
    (2) social distance scales
    (3) personality inventories
    (4) projective techniques

53. The Kuder-Richardson formulas are used to obtain estimates of

    (1) dispersion
    (2) test reliability
    (3) test parameters
    (4) test validity

54. A correlation coefficient of .62 is reported between the scores on an English test and an English teacher's rank order of the achievement of her pupils in English. The statistic is evidence of the test's

    (1) construct validity
    (2) concurrent validity
    (3) predictive validity
    (4) content validity

55. A coefficient of stability is a measure of a test's

    (1) predictive validity
    (2) reliability
    (3) degree of objectivity
    (4) construct validity

56. The criterion of randomness in a sample is met when every person in the population from which the sample has been drawn

    (1) has come from the same sub groups
    (2) has been known to be of the same sex and race
    (3) has been selected on an alphabetic basis
    (4) has had an equal and independent chance of being chosen

57. Of the following, the best justification for employing a single group without controls in educational experimentation is to

(1) show the superiority of one teaching method over another
(2) measure individual or group improvement
(3) discover underlying correlative factors
(4) simplify sampling procedures

58. In consulting with a group of teachers on a project involving the measurement of student growth in art appreciation, the most appropriate procedure for the consultant is to

(1) tell the teachers freely what they need to do
(2) present the teachers with a well thought out plan
(3) present help only on specific request
(4) work with the teachers on each step in the process

59. The following four steps represent an analysis of an experimental procedure:

a. collection of evidence
b. appraisal of the tentative generalization
c. adoption of the operational hypotheses
d. definition of problem

The steps should be taken in the following order:

(1) dcab
(2) abcd
(3) cdab
(4) badc

60. The primary purpose of randomization principles in the design of experiments is to

(1) exclude a number of alternative interpretations
(2) objectify the experimental evidence
(3) equate the number of degrees of freedom in the cells
(4) validate the tests of significance

61. According to Corey, action research in education differs from "pure research" in that action research places greater emphasis on the

(1) discovery of fundamental educational laws
(2) orientation of practitioners to self-study
(3) experimental design
(4) nature of the sample

62. Of the following, the best summary source of critical reviews of published tests is

(1) Buros' Mental Measurements Yearbook
(2) Review of Educational Research
(3) Psychological Abstracts
(4) Education Index

63. In judging the merit of a proposed title for a scientific research report, which one of the following criteria is the least important? The title should be

(1) reasonably short
(2) descriptive
(3) correctly worded
(4) attention arresting

64. Factorial designs, such as the Latin or Graeco-Latin squares, have as their primary objective the estimation of the effects of

(1) the interaction of control and experimental groups
(2) a control variable
(3) covariance on the independent variable
(4) several variables

65. The primary purpose of replication as a principle of experimental design is to

(1) control outside variables which would provide alternate explanations of the results
(2) supply an estimate of error by which to judge the significance of certain comparisons
(3) increase the precision of the experiment
(4) make the test material more homogeneous than it would otherwise be

66. In an experiment to determine the effect of the tempo of music on workers' productivity in a factory setting, the dependent variable is the

(1) tempo of the music
(2) factory setting
(3) number of workers
(4) workers' productivity

67. In an experiment to investigate the extent to which learning changes systematically with increasing age, the independent variable would be

(1) length of the list to be learned
(2) age levels of those tested
(3) change from trial and error to insightful learning
(4) number of errors made on learning trials

68. The following statement is an illustration of an operational definition:

(1) a yard is 36 inches
(2) men are stronger than women
(3) ice cream has more calories than pretzels
(4) Portland, Oregon has more rain than Tucson, Arizona

69. A scientist understands an event when he

(1) has stipulated the variables related to its occurrence
(2) has seen it happen often
(3) feels aware of the reality involved
(4) has given an operational definition

70. Understanding an event in science is equivalent to

(1) analyzing it
(2) reproducing it
(3) explaining it
(4) observing it

71. One of the two functions a theory serves is to

(1) solve practical problems
(2) resolve philosophical disputes
(3) substitute for experimentation
(4) integrate existing data

72. The most elementary aspect of scientific method is

(1) experimentation	(3) operationalism
(2) natural observation	(4) scientific theory

73. Intensive observation of a single person is generally known as

(1) the clinical method	(3) the experimental method
(2) the survey method	(4) the double-blind method

74. The most important characteristic of the experimental method is

(1) the repetition of observations
(2) the control and systematic variation of the conditions of observation
(3) the making of exact measurements
(4) the concept of correlation

75. The most important result that comes out of experiments in which several variables are studied is

(1) greater efficiency
(2) greater stability of results
(3) the ability to study interaction between variables
(4) greater degree of control

Part II. (25 credits)

Define and illustrate ten (10) of the following:

1. operational definition
2. cross-sectional method
3. Hawthorne effect
4. status study
5. external criticism (in historical research)
6. error of fractionation
7. error of central tendency
8. non-directive interview
9. response set
10. level of significance
11. ordinal scale of measurement
12. halo effect

APPENDIX

RESEARCH TRAINING INSTITUTE FOR JUNIOR COLLEGE PERSONNEL

CALCULATING MACHINE PROFICIENCY TEST - FORM A

Note - All answers are to be rounded too three decimal places, unless otherwise noted.

---

1. ADD:

1323.4
69.864
16.42
120.13
.054
23.22
1.9
16.008

Ans. ____________

---

2. ADD AND/OR Subtract:

+1428.684
− 13.2
− 21.602
+ 179.62
− 68.679

ANS. ____________

---

3. Multiply ADD AND/OR Subtract:

$32.86 \times 59.6936 \times 5.4$
$+ (42.01378 \times 17.69)$
$- (15.736 \times 8.309)$

ANS. ____________

---

4. DIVIDE: $4836.98 \div 36.079$ ANS. ____________

---

5. EVALUATE:

$$\sqrt{\frac{62(48.9)^2 - (34.88)^2}{62}}$$

ANS. ____________

---

6. EVALUATE:

$$\sqrt{.00'00'00'04873}$$

ANS. ____________

RESEARCH TRAINING INSTITUTE FOR JUNIOR COLLEGE PERSONNEL
Rockland Community College

Institute Participant Questionnaire- FORM A

1- What benefits do you expect to derive from your attendance at the Institute?

2- What problems or difficulties do you anticipate?

3- What would you characterize as your strengths related to your ability to plan and conduct educational research?

4- What would you characterize as your weaknesses related to your ability to plan and conduct educational research?

5- What areas and topics do you believe should be emphasized in this Institute? Please list.

6- Please use back of this paper for any comments or questions.

Research Training Institute for Junior College Personnel

Mid-program Reactionnaire

I. Lecture content:

Research

7 6 5 4 3 2 1

worthwhile — not worthwhile

Statistics

7 6 5 4 3 2 1

wirthwhile — not worthwhile

Comments:

II. Teaching techniques:

7 6 5 4 3 2 1

very effective — very ineffective

Comments:

III. Program pace:

7 6 5 4 3 2 1

too fast — too slow

Comments:

IV. Statistics Laboratory:

7 6 5 4 3 2 1

helpful — not helpful

Comments:

V. Program requirements:

7 6 5 4 3 2 1

excessive … too light

Comments:

VI. Seminar sessions

7 6 5 4 3 2 1

worthwhile … not worthwhile

Comments:

VII. Site visit and PERT demonstration:

A. Visit to ETS:

7 6 5 4 3 2 1

worthwhile … not worthwhile

B. PERT demonstration:

7 6 5 4 3 2 1

worthwhile … not worthwhile

Comments:

VIII. Suggestions for modifications and other appropriate comments:
(Use reverse side, if needed.)

RESEARCH TRAINING INSTITUTE FOR JUNIOR COLLEGE PERSONNEL

Rockland Community College

End-Of-Program Questionnaire - Form B

Part One

I. Lecture content:

A. Research

7	6	5	4	3	2	1
worthwhile						not worthwhile

B. Statistics

7	6	5	4	3	2	1
worthwhile						not worthwhile

II. Teaching techniques:

7	6	5	4	3	2	1
very effective						very ineffective

III. Program pace:

7	6	5	4	3	2	1
too fast						too slow

IV. Statistics Laboratory:

7	6	5	4	3	2	1
helpful						not helpful

V. Program requirements:

7	6	5	4	3	2	1
excessive						too light

VI. Seminar sessions:

7	6	5	4	3	2	1
worthwhile						not worthwhile

VII. Site visits:

A. Visit to Abacus Associates

7	6	5	4	3	2	1
worthwhile						not worthwhile

B. Visit to IBM

7 6 5 4 3 2 1
worthwhile — not worthwhile

C. Visit to Exhibit on Educational Technology

7 6 5 4 3 2 1
worthwhile — not worthwhile

D. Demonstration of McBee Keysort Systems

7 6 5 4 3 2 1
worthwhile — not worthwhile

Comments:

Part Two

1. What benefits did you derive from your attendance at the Institute?

2. What problems or difficulties did you experience during your attendance at the Institute?

3. Now that you have attended the Institute, what would you characterize as your strengths in relation to your ability to plan and conduct educational research?

4. Now that you have attended the Institute, what would you characterize as your weaknesses in relation to your ability to plan and conduct educational research?

5. What areas and topics in educational research methodology dealt with in the program received too little emphasis?

6. What areas and topics in educational research methodology dealt with in the program received too much emphasis?

7. What areas and topics in educational research methodology dealt with in the program will be of special value and usefulness to you?

8. What experiences and activities did you find particularly valuable? Why?

9. What experiences and activities did you find not particularly valuable? *Why*?

10. What other experiences and activities would you like to have had?

11. What is your appraisal of each of the following aspects of the program and what would you change if another program were offered?

    A. Ratio of administrative and instructional staff to number of participants.

    B. Selection of trainees (criteria)

    C. Class size

    D. Timing and length of program

E. Daily schedule

F. Facilities provided by Rockland Community College

G. Housing facilities

12. What were the major strengths or unique features of the program?

13. What were the major weaknesses of the program?

14. Taking into account all your experiences in the Institute, how would you rate the program? Check your choice.

_____1. Of very slight value

_____2. Of slight value

_____3. Fairly valuable

_____4. Valuable

_____5. Of substantial value

_____6. Of very substantial value

_____7. Extremely valuable

15. Do you think that research training institutes for junior college personnel should be conducted again, particularly if they took into account your recommendations for modifications and changes? Please comment.

Supplement to

End-Of-Program Questionnaire - Form B

I. Please rate your opinion of the instruction in the use of the calculating machine.

7 6 5 4 3 2 1

Comments:

II. Kindly rate Speaker E on the rating scale below, giving the reasons for your rating.

7 6 5 4 3 2 1

Comments:

III. Please give your appraisal of the overall effectiveness of guest speakers and what you would change if another program were offered.

APPENDIX G

Evaluation of Trainees' Progress

1. Statistics and Research Methodology and Instruments Achievement Test Results: Pre- and Post.
    (a) Reliability data for these tests
    (b) Correlations between tests
2. Summary of Ratings - Mid-program Reactionnaire
3. Summary of Ratings - End-of-program Questionnaire - Form B

Table 24

Pre-test, Post-test, and Gain Scores
of Trainees on Achievement Test on Statistics
and Achievement Test on Methods and Instruments of Research.
Correlations Between Tests.

	Statistics		Research Methods and Instruments	
	Pre-test	Post-test	Pre-test	Post-test
N	18	18	18	18
Mean	38.5	70.7	41.3	71.4
Median	38.5	73.5	40.5	72.1
Range	(17 - 63)	37 - 95	29 - 62	(59 - 84)
S.D.	12.8	10.2	8.8	4.1

Mean gain in Statistics - 32.2 points
Mean gain in Research Methods and Instruments - 30.1

Table 25

Reliability Coefficients of Achievement Test on Statistics and Achievement Test on Methods and Instruments of Research

---

Kuder-Richardson Formula #21 Internal Consistency Coefficients of Reliability

---

Pre-test Statistics - .86 $(p < .01)$
Post-test Statistics - .81 $(p < .01)$

Pre-test Research - .69 $(p < .01)$
Post-test Research - .88 $(p < .01)$

Test-Retest Reliability Coefficients

Pre- and post-test Statistics - .74 $(p < .01)$

Pre- and post-test Research - .68 $(p < .01)$

Table 26

Correlations Between Achievement Test on Statistics and Achievement Test on Methods and Instruments of Research (Pre- and Post)

Pre-test Statistics and pre-test Research - .69 $(p < .01)$

Post-test Statistics and post-test Research - .76 $(p < .01)$

Mid-program Reactionnaire

Summary of Ratings by Participants
(N = 18)

I. Lecture content - Research
Rating Scale: 1 (not worthwhile) - 7 (worthwhile)
Mean Rating - 6.7

Lecture content - Statistics
Rating Scale: 1 (not worthwhile) - 7 (worthwhile)
Mean Rating - 6.0

II. Teaching techniques
Rating Scale: 1 (very ineffective) - 7 (very effective)
Mean Rating - 6.1

III. Program pace
Rating Scale: 1 (too slow) - 7 (too fast)
Mean Rating - 5.3

IV. Statistics Laboratory
Rating Scale: 1 (not helpful) - 7 (helpful)
Mean Rating - 5.9

V. Program requirements
Rating Scale: 1 (too light) - 7 (excessive)
Mean Rating - 5.2

VI. Seminar sessions
Rating Scale: 1 (not worthwhile) - 7 (worthwhile)
Mean Rating - 5.3

VII. Site visit and PERT demonstration
A. Visit to ETS
Rating Scale: 1 (not worthwhile) - 7 (worthwhile)
Mean Rating - 5.2

B. PERT demonstration
Rating Scale: 1 (not worthwhile) - 7 (worthwhile)
Mean Rating - 5.4

End-of-Program Questionnaire - Form B

Summary of Ratings by Participants
(N = 18)

I. Lecture content - Research
Rating Scale: 1 (not worthwhile) - 7 (worthwhile)
Mean Rating - 6.3

Lecture content - Statistics
Rating Scale: 1 (not worthwhile) - 7 (worthwhile)
Mean Rating - 6.2

II. Teaching techniques
Rating Scale: 1 (very ineffective) - 7 (very effective)
Mean Rating - 6.3

III. Program pace
Rating Scale: 1 (too slow) - 7 (too fast)
Mean Rating - 5.5

IV. Statistics Laboratory
Rating Scale: 1 (not helpful) - 7 (helpful)
Mean Rating - 6.3

V. Program requirements
Rating Scale: 1 (too light) - 7 (excessive)
Mean Rating - 5.4

VI. Seminar sessions
Rating Scale: 1 (not worthwhile) - 7 (worthwhile)
Mean Rating - 5.6

VII. Site visits
A. Visit to Abacus Associates
Rating Scale: 1 (not worthwhile) - 7 (worthwhile)
Mean Rating - 5.6

B. Visit to IBM
Rating Scale: 1 (not worthwhile) - 7 (worthwhile)
Mean Rating - 4.8

C. Visit to Exhibit on Educational Technology
Rating Scale: 1 (not worthwhile) - 7 (worthwhile)
Mean Rating - 5.8

D. Demonstration of McBee-Keysort Systems
Rating Scale: 1 (not worthwhile) - 7 (worthwhile)
Mean Rating - 5.7

VIII. Instruction on calculating machine
Rating Scale: 1 (not worthwhile) - 7 (worthwhile)
Mean Rating - 6.3

IX. Guest Speakers
Rating Scale: 1 (not worthwhile) - 7 (worthwhile)
Mean Rating - 6.1

APPENDIX H

Summaries of Trainees' Comments and Recommendations

1. Institute Participant Questionnaire - Form A
2. Mid-program Reactionnaire
3. End-of-program Questionnaire - Form B

Table 27

Institute Participant Questionnaire - Form A

1 - Benefits Trainees Expect to Derive From Institute Attendance	N
Acquire greater knowledge of research methodology and techniques	11
Acquire or improve knowledge of statistics	4
Supervised writing of proposal	3
Help in curriculum development	2
Interchange with teachers and administrators	2
Information about submitting a proposal for federal aid	1
Prepare a pilot study for dissertation	1
Prepare research instrument	1
Enrich research background	1
Assist in preparation for advance degree study	1
Develop services that are unique for junior colleges	1
Development of junior college textbook	1
Reactivate formal educational growth	1

2 - Problems and Difficulties Trainees Anticipate	N
Statistics and mathematical computations	9
Preparation and organization of research materials	4
Pressure of time, shortness of time	3
Lack of or finding of materials	3
Evaluation of research findings and data	2
Development of criteria for determining researchability of problem	1
Use of calculating machine	1
Problems that are not now anticipated	1
No obstacles to completing the program	1

3 - Strengths Related to Trainees' Ability to Plan and Conduct Educational Research	N
Motivation, stick-to-it-ness, desire to grow professionally, commitment, etc.	8
Experience in research, library research, survey research, etc.	6
Qualities of mind -- conceptual ability, organizational ability, good at details, inquiring attitude	4

(Table continued on next page)

Table 27 (continued)

3 - Strengths Related to Trainees' Ability to Plan and Conduct Educational Research (cont'd)	N
Writing ability	2
Observational ability	1
Insistence on empirical data	1
Belief in research approach and its values	1
Relationships to individuals in research field	1
Knowledge of statistics	1
Classroom experience	1
Familiarity with higher educational field	1
No way of measuring strengths	1

4 - Weaknesses Related to Trainees' Ability to Plan and Conduct Research	N
Statistical knowledge and background	9
Theory and methods of research in education	3
Inexperience	2
Use of data processing methods, machines and devices	2
Area of research interest	1
Literature searching	1
Selection of research problems	1
Lack of time available to do research on job	1
Preparation of surveys, questionnaires	1
General ignorance	1
Lack of interest in detail work	1

5 - Areas That Trainees Believe Should Be Emphasized	N
Research methodology and design	4
Curriculum design and development, survey	4
Development of research instruments, questionnaires, etc.	3
Developments and innovations in junior colleges	3
Statistics	2
Selection, admission of students	2
Functional ideas	1
Use of data processing machines, data collecting	1
Classroom testing	1
Student personnel problems	1
Calculating machine usage	1
Criteria for selection of texts	1

(Table continued on next page)

Table 27 (continued)

5 - Areas That Trainees Believe Should Be Emphasized (cont'd)	N
Community needs	1
International relations	1
Sampling	1
No answer	1

6 - Comments and Questions of Trainees	N
We need to stress educational technology	1
Social affairs and picnics	1
Anticipating a lot of hard work	1
No comment	14

Table 28

Mid-program Reactionnaire

Comments of Trainees

Part I - Lecture Content: Research and Statistics	N
Positive Comments	
Competence of principal instructor impressive, excellent	2
Initial background broadened	2
Well planned	1
Excellent	1
Both areas well covered	1
Statistics clear and concise	1
Lectures are "backbone"	1
Enjoyable lectures	1
Material great	1
Getting something out of definitional aspects	1
Recommendations and Critical Comments	
Text pitched at too high a level	1
Too much statistics, not enough research	1
Resent statistics not being immediately applicable	1
Too fast, particularly statistics	1
Need more time for study	1
Research lectures a bit superfluous	1

Part II - Teaching Techniques	N
Positive Comments	
Teaching effective, superb, very effective, good	4
Outlines on board helpful	2
Good for me in all aspects	1
Adequate variety	1
Effective organization	1
Instructor most patient	1
Learning should take place	1

(Table continued on next page)

Table 28 (continued)

Part II - Teaching Techniques	N
Recommendations and Critical Comments	
Anticipates previous background in math. and stat.	2
Recommend shorter class sessions	1
Recommend smaller groups	1
Statistics laboratory could be somewhat better	1
Teaching hurried, especially statistics	1
Students should be grouped in two ability groups	1
Use principal instructor and program director for two groups	1
Great amount of reading required to grasp content	1

Part III - Program Pace	N
Good pace, pace alright, O.K., etc.	5
Too fast in statistics	4
Too fast	3
References to weak math background of trainees	2
Requires more time for study	2
Pace dull, but O.K. considering individual differences	1
After all this is my vacation (!)	1

Part IV - Statistics Laboratory	N
Positive Comments	
Helpful, excellent	4
Time satisfactory	2
Most interesting part of program	1
Recommendations and Critical Comments	
Break up problems into smaller parts with feedback	1
Machine for each student	1
Lab should be open earlier (A.M.) and later (P.M.) Note: latter was done	1
Problem handout sheets consolidated	1
Students should recite problem steps	1
More time to research	1
Make laboratory longer	1
Miscellaneous comments or no answer	4

Table 28 (continued)

Part V - Program Requirements	N
Positive Comments	
Program satisfactory	5
"Excessiveness is an advantage"	1
Objectives are clear	1
In keeping with other institutes attended	1
Recommendations and Critical Comments	
Too heavy in some aspect	8
Requirements are too light	1
Recommend an 8-week program	1
Make typewriters available	1
Note: College typing room opened to trainees at all times.	
Trainees' backgrounds too diverse	1
Block of time needed for research proposals	1
Institute's work affected by family needs	1

Part VI - Seminars	N
Positive Comments	
Very worthwhile, gained much, profitable, etc	8
Fairly good	1
Recommendations and Critical Comments	
Compulsive talkers! Domination by few	3
Should discuss published research too	1
Should digress more	1
Divide into sub-groups	1
Note: this was done	
Structure more	1
Delay, then disciplined discussions	1
Time wasted in shaping up proposals	1
More time needed	1
Time consuming	1

Table 28 (continued)

Part VII - Site Visit to ETS and PERT

ETS

ETS inspirational, worthwhile, enjoyable, very informative, good to know about, profitable, desirable, etc.	7
Not worth an entire day	1
ETS does not know much about junior colleges	1

PERT

Valuable, very informative, good experience, worthwhile, profitable, desirable, gained information	7
Need more time on PERT	1
Too technical, irrelevant	1
Application vague	1

Part VIII - Suggestions for Modifications and Other Remarks

Positive Comments

Staff always present to answer questions	1
Course well planned	1
Teaching excellent	1
Good public relations evident	1
Overall quite valuable	1
Fills needs perfectly	1
Moving well	1
Useful in a number of ways	1
Principal instructor brilliant	1
~~Lkes~~ role of program director in team approach Likes	1

Recommendations and Critical Comments

Statistics emphasis should have been spelled out in recruitment	2
Pace too fast, need more time	2
Need more time for proposals	2
Refresher course needed in math and basic stat	1
Need more time in developing research instruments	1
Need more instruction in the calculating machine	1
Better matching of trainees needed in ability	1
Dissatisfied with housing and stipend	1
Application materials should have been sent earlier	1

Table 29

End-of-program Questionnaire - Form B

Comments of Participants

Part I - General Comments	N
Eliminate certain site visits	3
Field trips well planned	3
Pace too fast	2
Excellent program	2
Program should be longer	1
Use overhead projector in course work	1
Individual proposal sessions rather than group	1
Visit Teachers College Library - 2 days	1
Less "public relations" on site visits	1
Retain Abacus visit next time	1
Eliminate certain site visits	1
Add certain site visits	1
Seminar groups should be smaller	1

Part II-1 - Benefits Derived From Attendance at Institute	N
Helpfulness of the program content, research methodology and statistics	10
Interaction with Institute staff	3
Aspects of program; field trips, PERT, McBee-Keysort, etc	3
Help received on research proposal	2
Encouraged to take advanced study	2
Greater awareness of importance of research	2
Broadening of appreciation of junior college problems	1
Encouraged to undertake research	1
Interaction with trainees	1
Would not have missed	1
Learned own limitations	1

(Table continued on next page)

Table 29 (continued)

Part II-2 - Problems or Difficulties Experienced During Attendance at Institute	N
Not enough time to accomplish all they wanted	9
Lack of secretarial help	2
Lack of basic math background	2
Statistics too difficult	1
Lack of education background, terminology, etc	1
Housing overpriced and accommodations misrepresented	1
Wanted more individual attention	1
Personal problems	1

Part II-3 - Characterizations of Trainees' Strengths In Planning and Conducting Educational Research After Institute Attendance	N
Greater abilities to do effective educational research	11
Greater awareness of educational research problems and their relevance	3
Desire to participate actively in scientific research	3
Greater knowledge of basics and math	3
Not sure I have any strengths	1
Awareness of junior college problems	1
Greater self confidence	1

Part II-4 - Characterization of Trainees' Weaknesses in Planning and Conducting Educational Research After Institute Attendance	N
Statistics (general weakness)	4
Use of certain statistical techniques	4
Ability to do research writing	2
Lack of interest in requirements of educational research investigations	2
Ability to do library research	1
Communication of subject matter field	1
Ability to think through research problems	1
Ability to make choice of research procedure	1
Ability to handle complicated research problems	1
Need more time	1

(Table continued on next page)

Table 29 (continued)

Part II-5 - Educational Research Methodology Areas and Topics Receiving Too Little Emphasis	N
Program was balanced and/or adequate	5
More time for writing research proposals	4
More help needed for writing research proposals	2
Historical research	2
Descriptive research	1
Visits and use of regional libraries (TC)	1
Data gathering instruments	1
PERT	1
More general help would be needed for conduct of specific research project	1

Part II-6 - Educational Research Methodology Areas and Topics Receiving Too Much Emphasis	N
Program was balanced	4
No topic or area received too much emphasis	3
Statistics	3
Statistics as a research tool	1
Group seminars	1
Statistics as opposed to research methodology	1
Research methodology as opposed to statistics	1
Balanced but not what I expected	1
Other	2

Part II-7 - Areas and Topics in Educational Methodology Dealt With In the Institute of Special Value and Usefulness to Trainees	N
Educational research techniques	7
Research problems and research in general	5
Research design	3
Proposal writing	2
Statistics	1
Statistics laboratory	1
Development of interest in research reading	1

(Table continued on next page)

Table 29 (continued)

Part II-8 - Particularly Valuable Experiences and Activities	N
Seminar sessions	4
Statistics laboratory	3
Specific statistics techniques	3
Total experience	2
Teaching staff	2
Interacting with other trainees	2
Site visits	2
Institute research and statistic handouts	1
Research lectures	1
Use of calculating machines	1
Research techniques, learning of	1
Supervision of proposal writing	1
PERT	1

Part II-9 - Not Particularly Valuable Experiences and Activities	N
Certain of the site visits	5
Statistics, overemphasis or not interesting	3
None	3
Certain of the guest speakers	2
Criticisms of research proposals of other trainees	1
All were particularly valuable	1
No comments made	3

Part II-10 - Other Experiences and Activities Trainees Would Like to Have Had	N
More social life and cultural activities	4
"None," can't think of any	3
More site visits or to educational institutions	2
More library time during day	1
Keep statistics laboratory open later (this was done)	1
Going over research reports S-028 and 1750 in great detail	1
Use of micro card reader	1
More time on Ed. Res. and less on Statistics	1
Miscellaneous or no comment	4

(Table continued on next page)

Table 29 (continued)

Part II-11A - Trainees' Appraisal of Ratio of Administrative Staff to Number of Trainees; Recommended Changes	N
Satisfactory or better	10
Recommended two full-time instructors	3
Recommended use of consultants occasionally	1
Individual tutoring recommended	1
Staff overworked	1
Miscellaneous remarks or no comment	2

Part II-11B - Trainees' Appraisal of Selection of Trainee Criteria; Recommended Changes	N
A background in math or statistics recommended	7
Criteria were unsatisfactory	3
Criteria were satisfactory	2
Demonstrated interest in research	2
Selection for statistical background would eliminate desirable trainees	1
Adapt institute to more empirical or to statistical emphasis	1
Pre-institute preparation and study recommended	1
Should have similar backgrounds	1
Submit detailed proposals as aid to selection	1
Select sooner	1
Criteria need careful attention	1

Part II-11C - Trainees' Appraisal of Class Size of the Institute; Recommended Changes	N
Excellent, fine, ideal, just right, O.K., etc	14
Up to 25	2
18-20 with program director's participation	1
20 maximum	1

Part II-11D - Trainees' Appraisal of Timing and Length of Program; Recommended Changes	N
Fine, good, just right, etc	6
Start earlier (first week July, last week June mentioned)	6
8 weeks	3
10-12 weeks	1
9 weeks	1
8-12 weeks	1
4 weeks	1
1-2 weeks	1

(Table continued on next page)

Table 29 (continued)

Part II-11E - Trainees' Appraisal of Daily Schedule; Recommended Changes	N
Good, fine, O.K., best yet, just right, etc.	16
Lengthen by 1-1½ hours	1
8-12 and 1-2 P.M.; free time to study	1
More "breaks"	1
Less homework	1
Less statistics	1

Part II-11F - Facilities Provided by Rockland Community College	N
Excellent, perfect	6
More than adequate, very adequate, great	3
Fine, good	3
Praise for President, college staff, library staff and Library	3
Location greatest asset	1
Library "dismal," too far away from TC	1
Cafeteria needed (Note: College now has a new cafeteria in operation)	1
Miscellaneous	1

Part II-11G - Non-resident Trainees' Appraisal of Housing Facilities	N
Excellent, superb, fine, most desirable, wonderful, etc.	8
Fair	2
Poor, poorly arranged	2
O.K.	1
Rents high	1
Need to select housing disturbing	1

Part II-12 - Trainees' Appraisal of Major Strengths or Unique Features of the Institute Program	N
Teaching by Dr. Lang and Dr. Hochman, "team"	4
Instruction by Dr. Lang	3
Good instruction	2
Guest lecturers	2
Well thought out program	1
Excellent planning of seminars	1
Enthusiasm and skill of leadership	1
Dedicated patient instructors	1
Instructors most interested in program	1

(Table continued on next page)

Table 29 (continued)

Part II-12 (continued)	N
Extensive exposure to educational research	1
Site visits	1
Very good esprit de corps	1
Good balance in program	1
Concern with personnel without research background	1
Program itself was unique	1
Some of the trainees	1

Part II-13 - Trainees' Appraisal of the Major Weaknesses of the Program	N
Insufficient time for and guidance in proposals	3
Too much work	2
Too much statistics	1
Too much lecture	1
Seminars too large	1
Seminars	1
Diverse trainee background	1
Trainee selection	1
Method of payment should be earlier	1
Lack of social events	1
Lectures should have been more elementary	1
Domination and interruption by one participant	1
Publishers should have had display of materials	1
Lack of direction, planning, criteria for selection, stipend	1

Part II-14 - Trainees' Overall Evaluation of Program	N
Extremely valuable	7
Of substantial value	6
Of very substantial value	2
Valuable	2
Fairly valuable	1
Of slight value	0
Of very slight value	0

(Table continued on next page)

Table 29 (continued)

Part II-15 - Trainees' Opinions Whether a Similar Institute Should be Conducted Again, Particularly if Recommended Modifications are Incorporated	N
Should be conducted	16
Should not be conducted	1
Did not answer the question	1

Supplemental Sheet - Trainees' Rating of Calculating Machine Instruction	N
Too rapid	2
Very effective	1
Couldn't have worked without it	1
Great strength of course	1
Fine job	1
Excellent instruction	1
Patient and understanding instruction	1
Very precise	1
Patient and pleasant	1
Quite effective	1
Excellent	1
Received individual instruction	1
Should have been more individualized	1
Should have been repeated periodically from beginning for four weeks	1
Rating, but no comments	3

Supplemental Sheet - Trainees' Overall Comments Regarding Guest Speakers; Recommended Changes		N
Well chosen		1
Added significantly to Institute		1
Overall fine		1
Good - carried weight		1
Interesting		1
Highlights of course		1
Worthwhile on the whole		1
Opened new avenues of research		1
Provided better understanding of Institute's objectives		1
Very good		1
Difficult to improve		1
Recommendations:	Start earlier	1
	Start later	1
	More discussion	1
	Read their writings in advance	1
	More disciplined discussion	1
	Panels of speakers	1

APPENDIX I

Recruitment and Selection of Trainees; Program Announcements and Other Informational Materials

1. Application blank
2. Program announcements
3. Driving directions
4. Housing information
5. Request for research proposal outline

APPLICATION BLANK (please print or type)

RESEARCH TRAINING INSTITUTE FOR JUNIOR COLLEGE PERSONNEL

Note: All applications and inquiries should be directed to:

Irvin Hochman, Ph.D., Program Director
Rockland Community College, State University of New York
145 College Road, Suffern, New York (10901) Phone 914-EL 6-4650

Name: ______________________________ Date of Birth__________ Marital Status____
last middle first Sex ___________ Number of Dependents_____

Home Address: ______________________________ Home phone: __________________

Place of Employment:
Name of Institution: __________________________ Phone No.______
Address: ____
street city state

Title of Present Position: ___________________________

Duties Performed in Present Position: ______________________________________
____

Educational Background:

	Name	Dates Attended	Major	Diploma or Degree	Date Awrd
Secondary School					
College (undergraduate)					
Graduate School					

Are you presently taking graduate courses? Yes_____ No______
Are you currently a candidate for an advanced degree? Yes _____ No_____
Total graduate credits received beyond earned degree. _________

Work Background (list present position first)

Name of Employer	Position & Type of Work	Dates of Employment

Please list the course titles and credits received in all courses you have taken that were designed to train you for research; e.g., educational research methods, design of experiments, statistics, thesis seminar, dissertation seminar, etc. If in doubt, include anyway.

Name of Course	Credits	Graduate or Undergraduate (check)	Date Taken
1)			
2)			
3)			
4)			
5)			
6)			

Years of elementary school teaching ______________
Years of junior college teaching ________________
Years of teaching at college or university level other than junior college _________
Years of teaching)other, please specify) _________
Years of business or industrial experience ________

Titles of all published research, including master's thesis and doctoral dissertation

1.

2.

3.

Please write a brief statement regarding a research problem on which you would like to work during the Institute.

Briefly describe your general research interests in dealing with educational problems

Applicants are requested to submit at least one letter in support of their application from someone who is familiar with their work and interests.

Would you be interested in receiving information regarding housing, recreation, etc?
Yes ______ No ______

"RESEARCH TRAINING INSTITUTE FOR JUNIOR COLLEGE PERSONNEL"

The unprecedented growth of junior colleges, the great need for research, and the critical shortage of qualified researchers has led to the recognition that much of the needed research will have to be accomplished by junior college staffs rather than by specialists.

Sponsored by the U.S. Office of Education, a six-week Institute will be held for approximately 25 members of the administrative staffs and faculties of public junior colleges interested in seeking solutions to educational problems who wish to improve their research competence by a program of intensive training. Private junior colleges are also welcome to participat

PLACE AND DATES

Campus of Rockland Community College, State University of New York, Suffern, New York, July 11-August 19, 1966.

DESCRIPTION OF THE PROGRAM

Training will be provided in educational research methodology and statistics, encompassing not only the more formal research techniques, but including "institutional" and "action" research methods. Emphasis will be placed on evaluation of existing educational practices, including the development of evaluation procedures and instruments. Each participant during the Institute will be required to develop in detail one substantial research proposal.

Participants will meet daily from 9 a.m. - 3 p.m. five days per week, for six weeks, for lectures, seminars, work shops demonstrations, films, and visits to research and data processing centers. Trainees will receive regular laboratory training in statistics as well as instruction in the use of various calculating machines. Individualized guidance will be readily available and efforts will be made by the Institute staff to facilitate professional interaction among the trainees.

INSTRUCTIONAL STAFF

Gerhard Lang, Ph.D., Research Associate, N. Y. Board of Education, who has had extensive experience teaching research methodology and statistics, has directed large research projects, and has published many research articles, will be the principal instructor. He will be assisted by Irvin Hochman, Ph.D., the program director. Prominent guest lecturers and consultants will also be utilized.

ELIGIBILITY FOR SELECTION

Applicants must hold full time faculty or administrative positions in a public junior college, have an expressed interest in research training, and be willing to participate actively in the program and to complete the required work.

Geographical distribution and research interests will be considered in the selection of participants.

Interested applicants are asked to fill out enclosed application materials at the earliest possible opportunity. Upon notification of acceptance, the applicant will be expected to prepare an outline of a research problem in which he is interested and how he proposes to deal with it. This outline must be submitted prior to the beginning of the

Institute.

All applications and inquiries should be directed to Dr. Irvin Hochman, Program Director, Research Training Institute, Rockland Community College, State University of New York, 145 College Road, Suffern, N.Y. 10901.

STIPENDS

The stipend for an Institute trainee is $75 per week. The dependency allowance is $15 per week per dependent. Reimbursement at the rate of 8¢ per mile for one round trip between his place of residence and the training institution will be allowed.

For determining dependency allowances, the Office of Education's policy is as follows:

> An allowance may be claimed for a dependent of a trainee enrolled in a short-term Institute or Special Training Project only if the trainee establishes a special temporary residence specifically for the purpose of attending the Institute or Special Training Project and then only if the dependent accompanies and resides with him during the training period.

I am pleased to inform you that a U.S. Office of Education supported "Research Training Institute for Junior College Personnel" will be conducted this summer on the campus of Rockland Community College. Through the utilization of the reservoir of talent existing in our own teaching and administrative staffs, it is believed that this institute may prove an effective approach to relieving the critical shortage of researchers.

May I ask your assistance in seeing that the attached descriptive materials and application blanks are brought to the attention of your administrative and teaching personnel? If you believe that any particular individual would especially benefit from the training, you might want to write a letter in support of his application.

All applications and inquiries should be directed to Dr. Irvin Hochman, Program Director. Dr. Hochman tells me that he hopes to process the bulk of the applications in about two weeks from the date of this letter and that applicants will be notified shortly thereafter.

Because of the lateness in the season, the Office of Education has given the Institute staff permission to begin this informal recruitment of trainees, but has asked that no public announcements be made as yet.

Thank you. All best wishes.

Cordially,

Seymour Eskow
President

SE:agc

May 23, 1966

Office of the President

Dear Sir:

Your cooperation in seeing that copies of the enclosed announcements are distributed to full-time members of your administrative and teaching staffs will be greatly appreciated.

Since governmental policy does not permit public announcement, as yet, and because of the late date on which approval of this Research Training Institute for Junior College Personnel was received from the U.S. Office of Education, we are adopting this supplemental method of recruitment so that the selection of participants can be completed as quickly as possible.

Thank you so much for your help.

Sincerely yours,

Irvin Hochman, Ph.D.
Program Director

TRAINING INSTITUTE FOR JUNIOR COLLEGE PERSONNEL

TRAVEL DIRECTIONS BY CAR TO
ROCKLAND COMMUNITY COLLEGE
145 College Road
Suffern, New York Phone: 914- EL 6- 4650

New York State Thruway to the Spring Valley, Route 59 Exit, which is Exit 14. When you come off the thruway, you go west, a right, toward Suffern; you will then be on Route 59. To get to the College you continue west on Route 59 for 3.5 miles at which point you will be at College Road. On the right side, at the intersection of Route 59 and College Road, there is a large piano and organ display building owned by DeWaard Bros., it is here that you turn right onto College Road. Continuing north on College Road 1.7 miles, you will see the College (a large red brick building) on the left. Park in the parking lot just before large brick building.

Alternate Route

George Washington Bridge to Palisades Interstate Parkway to Exit 9. Thruway interchange north, Buffalo. 2nd interchange (over the bridge) take right hand fork - you are then on N. Y. S. Thruway. Take Exit 14, which will be the first Exit after you arrive on the Thruway. Then follow directions as above.

I am happy to be able to write you that your application to the Research Training Institute for Junior College Personnel has been approved. Will you please check the enclosed post-card to confirm your plan to participate?

An outline of an educational research problem in which you are interested, including your tentative plans for treating this problem, should be submitted before June 24, 1966. This plan need not be overly elaborate!

Please do not hesitate to phone or write me if you have any questions. Inquiries made prior to the date of this letter will be answered as soon as possible.

I look forward to a mutually productive association with you this summer.

Sincerely,

Irvin Hochman, Ph.D.
Program Director

IH:amy
Enc.

June 19, 1966

TO: Participants, Research Training Institute
for Junior College Personnel

FROM: Irvin Hochman, Ph.D.
Program Director

SUBJECT: "Statement of Appointment"

Will you please fill out as soon as possible the enclosed "Statement of Appointment" and send all but the "trainee copy #5 to my office at the College?

Tentatively, our business office informs me that the schedule of payments will be August 5 ($150.00), August 19 ($150.00), and September 2 ($150.00). These amounts will, of course, be increased by the amount of the dependency allowances for which you are eligible.

For determining dependency allowances, the Office of Education's policy is, you will recall, as follows:

"An allowance may be claimed for a dependent of a trainee enrolled in a short-term Institute only if the trainee establishes a special temporary residence specifically for the purpose of attending the Institute and then only if the dependent accompanies and resides with him during the training period."

With respect to reimbursement for travel, you will recall that this will be at the rate of 8¢ per mile for one round trip between your place of residence and Rockland Community. The calculation is based on standard mileage charts and if you do not have such handy, please leave the item blank and I will fill it in for you.

Please be patient about housing information, it is being compiled and will reach you as soon as possible. We are currently running adds in the local newspapers, also, special articles.

If you wrote me regarding other specific questions, I will be writing you shortly.

Cordially,

Irvin Hochman

Irvin Hochman

June 13, 1966

TO: Participants in the Research Training Institute for Junior College Personnel

FROM: Irvin Hochman, Ph.D., Program Director

SUBJECT: Housing Information

A number of you have indicated an interest in receiving housing information. Since Rockland Community College does not have its own facilities participants are expected to make their own arrangements. However, I want to be as helpful as possible.

As soon as the information is available, I plan to mail you current lists of vacancies, prices, locations, distances from the College, facilities provided, and physical condition of these facilities. I will try to locate vacancies close to the College, but it may be necessary for you to plan on a short drive.

You, on your part, can help me by filling out the enclosed questionnaire as soon as possible, being sure to add information about your special needs. If you do not live at too great a distance, you might want to explore the housing situation on your own. I will be happy to provide you with possible "leads."

Please mail the questionnaire to my home rather than to the College. My address is 120 Summit Avenue, Dumont, New Jersey, 07628. My home phone number is 201-385-7122.

Do not hesitate to contact me at any time between now and the start of the Institute if you have any questions.

Best Wishes.

RESEARCH TRAINING INSTITUTE FOR JUNIOR COLLEGE PERSONNEL

(Housing Questionnaire)

Please return this questionnaire as soon as possible to

Irvin Hochman, Ph.D.
120 Summit Avenue
Dumont, New Jersey 07628

Name: ____________________ College Phone: ______________

College: ____________________ College Address: ______________

____

Home: ____________________ Home Address: ______________

Home phone: ______________ ______________

I am interested in information about:

___ furnished room.

___ furnished room (cooking facilities)

____furnished rooms ___ no. needed

____furnished rooms (cooking facilities) ____ no. needed

___furnished apartment ___ no. of rooms

___ furnished home

Please provide detailed information regarding your special needs, problems, financial details, etc.

RESEARCH TRAINING INSTITUTE FOR JUNIOR COLLEGE PERSONNEL

(Housing Questionnaire)

Please return this questionnaire as soon as possible to

Irvin Hochman, Ph.D.
120 Summit Avenue
Dumont, New Jersey 07628

Name: ____________________ College Phone: ______________

College: ____________________ College Address: ______________

____

Home: ____________________ Home Address: ______________

____

Home phone: ______________

I am interested in information about:

____ furnished room.

____ furnished room (cooking facilities)

____ furnished rooms ____ no. needed

____ furnished rooms (cooking facilities) _____ no. needed

____ furnished apartment ____ no. of rooms

____ furnished home

Please provide detailed information regarding your special needs, problems, financial details, etc.

June 23, 1966

TO: Participants in Research Training Institute for Junior College Personnel

FROM: Irvin Hochman, Ph.D., Program Director

SUBJECT: Housing Facilities

Enclosed you will find a current list of furnished rooms, apartments, and homes which may be availabe during the period of the Institute and suitable for your needs. I am also including Zerox copies of current classified listings in the local newspapers. At the time this memo was written, I had not been able to check out these newspaper listings. In addition, you will find Xerox copies of hotel and motel lisings taken from the local Rockland County Phone book. These may prove rather expensive and probably should be regarded as short term emergency facilities.

The main listing was compiled from phone responses to advertisements and special articles printed in the local newspapers. In all cases I have spoken personally to the owners and tried to get some idea of the accomodations, but I have not been able to make a personal inspection. They are all within thirty minutes(or less)drive to the college.

Preferably, you should contact the landlord yourselves and work out the necessary arrangements. Those of you who are within reasonable driving distance should give serious consideration to making a special trip into Rockland County to select your own accomodations.

If you plan to arrive a day or so before July 11, I will try to be available for help and directions.

Please do not hesitate to contact me if there are any special problems.

Sincerely,

I.H.,

Irvin Hochman

June 28, 1966

To: Participants, Research Training Institute
for Junior College Personnel

From: Irvin Hochman, Ph.Dl, Program Director

Re: Research Problem Outline

May I please send you this reminder that all participants are required to submit an outline of a research problem on which they would like to work this summer. Actually this was due on June 24, 1966.

Since this may have been overlooked, I would like to urge you to send in your outline at the earliest opportunity. We need to integrate these materials into our instructional program.

Thank you for your cooperation.

Irvin Hochman

APPENDIX J

Auxiliary Statistical Exercises and Class Materials (used in addition to those assigned in course syllabi)

Four Levels of Measurement and Statistics Appropriate to Each Level[1]

Dr. Gerhard Lang

Scale	Properties	Appropriate Statistics	Statistical Tests
Nominal	(1) Equivalence	Mode Frequency Contingency coefficient Chi square	Nonparametric statistical tests
Ordinal	(1) Equivalence (2) Greater than	Median Percentile Spearman rank-difference correlation Kendall τ Kendall W	
Interval	(1) Equivalence (2) Greater than (3) Known ratio of any two intervals	Mean Standard deviation Pearson product-moment correlation Multiple product-moment correlation	Nonparametric and parametric statistical tests
Ratio	(1) Equivalence (2) Greater than (3) Known ratio of any two intervals (4) Known ratio of any two values	Geometric mean Coefficient of variation	

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[1] Based on S. S. Stevens, On the theory of scales of measurement. Science, 1946, 103, 677-680.

For an excellent treatment of measurement see E. F. Lindquist (ed.) Educational Measurement. Washington, D. C.: American Council on Education, 1951, p. 819, particular the chapter by Irving Lorge, "The fundamental nature of measurement."

Dr. Gerhard Lang

Scores in a Personality Test

1	6	8	10	12	13	15	17	19	22
2	6	9	11	12	14	15	17	20	23
3	6	9	11	12	14	16	17	20	25
4	7	10	11	13	14	16	18	20	26
4	7	10	11	13	14	16	18	21	29

Frequency Distribution of Scores in a Personality Test

(1) Scores	(2) Tally Marks	(3) Frequencies = f	(4)	(5)	(6)	(7)	(8)	(9)

Distribution of Chemistry Aptitude Scores
Made by College Sophomores

Scores	f	Exact Upper Limit	cf	cP
90-94	4			
85-89	10			
80-84	14			
75-79	19			
70-74	32			
65-69	31			
60-64	40			
55-59	28			
50-54	29			
45-49	21			
40-44	18			
35-39	10			
30-34	6			
25-29	1			
20-24	3			
Sum	266			

1) Find the cumulative frequencies and tabulate them.
2) Find the cumulative percentages and tabulate them.
3) Plot the cumulative frequency polygon (see Fig. 2.3)
4) Plot the cumulative percentage polygon (ogive).
5) Compute all decile points, e.g. $P_{10}, P_{20}, \ldots P_{90}$.
6) Compute the percentile ranks (PR) corresponding to X = 43, 61, 86.

Statistics for Psychology and Education

59 27 ~~27~~ 46 31 35
36 22 24 38 38 34
17 30 22 36 28
31 34 42 31 20
39 37 52 17 29
43 43 50 21 36
50 56 37 32 25
42 47 33 40 32
35 32 29 44 36
30 21 27 37 38

Scores	f				

A. Set-up a frequency distribution

1. Best size interval______________
2. Number of intervals______________
3. Score limits of lowest interval______________
4. Exact limits of highest interval______________
5. Midpoint of lowest interval__________
6. Midpoint of highest interval_________

B. Calculate measures of central tendency

1. Arithmetic mean______________________
2. Median_________________________
3. Mode___________________________

C. Calculate measures of variability

1. Standard deviation________________
2. Semi-interquartile range___________

Dr. G. Lang

II. Measures of Variability (s- 10 points; Q- 10 points)

Determine the standard deviation and the semi-interquartile range of th
data listed below. Show all necessary work.

Scores	f						
85-89	2						
80-84	1						
75-79	4						
70-74	9						
65-69	13						
60-64	26						
55-59	19						
50-54	12						
45-49	8						
40-44	3						
35-39	2						
30-34	1						

standard deviation ________ Semi-interquartile range ______________

III. Cumulative Distribution (6 points)

What scores correspond to the following centiles?

Centile	Score
45th	_____
65th	_____
98th	_____

Dr. G. Lang

IV- Normal Distribution Curve (56 points)

The Minnesota Teacher Attitude Inventory was administered to a group of 935 teachers. Assume that the variable measured by this inventory is normally distributed. A mean of 70 and a standard deviation of 4 were determined.

A. What per cent of the cases may be expected to have scores that fall between the mean & "X".?

	X		X
(1)________	58	(3)__________	76
(2)________	64	(4)__________	81

B. What per cent of the teachers may be expected to have scores that fall between the following pairs of score limits, X_1 and X_2?

	X_1	X_2		X_1	X_2
(5)________	60	66	(7)__________	59	77
(6)________	64	84	(8)__________	74	78

C. What per cent of the teachers may be expected to have scores below "X"?

(9)________(X=58) (10)________(X=75) (11)________(X=63)

D. What per cent of the teachers may be expected to have scores above "X"?

(12)________(X=62) (13)________(X=80) (14)________(X=74)

(15)________(X=68)

E. What scores correspond to the following centiles?

(16) 13th centile___ (17) 25th centile___ (18) 75th centile___ (19)___90th centile

F. Locate the centiles corresponding to the following scores:

(20) X=63:_____ (21) X=71:_____ (22)_____X=80:______

G. What are the score limits of the middle 50 per cent of the group? the middle 60 per cent?

(23) the middle 50th %_____:_____ (24) the middle 60 per cent_____:_____

H. The probability of getting certain z (standard) scores:

(25) $P(z > 1.32) =$ _______ (26) $P(z < -0.85) =$ _______

(27) $P(-1.22 < z < 2.63) =$ ______ (28) $P(0 < z < 1.77) =$ _________

(29) $P(z > -2.15) =$ _________

I. Understanding basic concepts (25 points)

A. State four reasons why the study of statistics is important in psychologica research: (8)

1.

2.

3.

4.

B. State two conditions or situations which make it appropriate to calculate the (6)

Arithmetic mean: (1) ______________________________

(2) ______________________________

Median: (1) ______________________________

(2) ______________________________

Mode: (1) ______________________________

(2) ______________________________

C. List three discrete variables:	List three continuous variables: (6)
(1) ________________	(1) ________________
(2) ________________	(2) ________________
(3) ________________	(3) ________________

Briefly define each of these terms:

statistic

actuarial prediction

univocal category

parameter

statistical inference (or sampling statistics)

II. Measurement (20 points)

In the blank next to each item place the letter that goes with the best description of the measurement scale, as given by the following code:

N Nominal scale; O Ordinal scale; I Interval scale; R Ratio scale

__Temperature reading taken by the weather bureau

__Incidence of lung cancer among heavy smokers

__Academic hierarchy at New City University

__Degree of anxiety manifested by a patient as judged by a psychologist

__Chronological age of Miss Jones

__Number of persons who hate, love, or are indifferent toward a certain movie st

__Time spent in worrying about statistics

__The amount of love shown by a person to other people

__Admission or non-admission to F. D. U.

__Books in a library

Statistics for Psychology
and Education
Dr. G. Long

64	58	43	66	71	53	78	44	66	58
60	73	60	74	56	55	60	62	57	85
49	71	38	59	58	53	60	48	59	61
62	59	61	87	60	68	59	46	58	75
50	77	63	60	60	54	54	60	60	57
49	64	52	55	46	65	52	51	50	67
67	47	64	61	42	65	35	63	59	57
68	50	62	66	46	70	60	74	74	53
56	51	61	72	33	76	61	65	67	57
56	63	55	69	45	82	62	54	69	63

Scores	f				

A. Set-up a frequency distribution

1. Best size of interval____________
2. Number of intervals____________
3. Score limits of lowest interval____________
4. Exact limits of highest interval____________
5. Midpoint of lowest interval____________
6. Midpoint of highest interval____________

B. Calculate measures of central tendency

1. Arithmetic mean____________
2. Median____________
3. Mode____________

~~C. Calculate measures of variability~~

~~1. Standard deviation~~____________
~~2. Semi-interquartile range~~____________

Statistics- Dr. G. Lang

Following are scores made by students on a general science test:

33	71	54	67	38	15	44	18	25
42	21	68	03	46	38	36	41	
47	43	13	45	58	44	41	24	
61	37	50	47	36	40	39	32	
43	60	38	49	44	28	22	08	
52	43	40	58	55	27	36	33	

SCORES						

Determine: Arithmetic mean________; Median__________Standard deviation______

Semi-interquartile range________________

Statistics: Dr. G. Lang

(1) Round off your computed statistics to the nearest whole number. Use these numbers to answer the questions posed below.

(2) Assume a normal distribution.

(A) Approximately 1/6 of the students have a score which is larger than______

(B) Approximately 14% of the students have scores between______ and________

(C) John has a score of 55. This places him _____ standard deviation units __________the mean.

(D) Mary has a score of 10. This places her ______ standard deviation units __________the mean.

(E) The scores of the middle 50% of the students fall between _______ and ________. (Round off to the nearest whole numbers)

(F) The score distribution is _____ skewed. Why?

(G) Find z-scores for each of the following raw scores:

X	Z
10	____
30	____
60	____
70	____

1. Understanding Basic Concepts (16 points)

Before each of the following statements place the letter:

A if you think that the statement is always true.

S if you think that the statement is sometimes true.

N if you think that the statement is never true, i.e. it is clearly false.

__1. Knowing Q_1, Q_2, and Q_3 of a distribution one can detect skewness, if any exists.

__2. The 54th centile denotes a point in a score distribution which is exceeded by 54% of the cases.

__3. When the calculation of a median is indicated, the logical statistic denotin variability would be the standard deviation.

__4. Midpoints of score intervals are used in plotting an ogive.

__5. The standard deviation of a sample (N =60) is 5. Adding a 2 to each score in the distribution will change the standard deviation to 7.

__6. The semi-interquartile range is a measure of dispersion around the mean.

__7. Since the standard deviation is the most reliable measure denoting variabili it is the statistic which should be used.

__8. Knowing that the mean is 62 and the standard deviation is 3, you should expect about 1/3 of the cases to have scores higher than 65.

__9. The range is the second most reliable measure of variability.

__10. The distance in terms of score units is the same between Q_3 & Q_2 as it is between Q_2 & Q_1.

__11. The standard deviation is the most reliable measure of variability because it varies least when samples are randomly drawn from different populations.

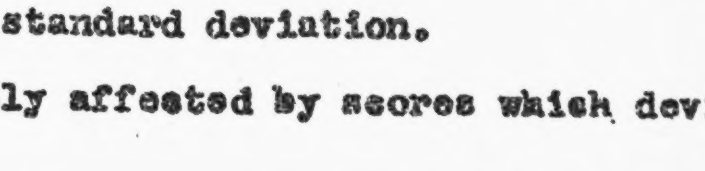
__12. Grouping errors tend to decrease the standard deviation.

__13. The semi-interquartile range is greatly affected by scores which deviate greatly from the mean.

__14. The standard deviation would be the best measure of variability in a distribution which is arranged as follows: \$1000-1999 (f=26) \$2000-2999 (f=59 \$3000-3999 (f=82) \$4000-4999 (f=115) \$5000-5999 (f=91) \$6000-6999 (f=61) \$7000- (f=25)

__15. Selecting at random a large group of 8 year old children enrolled in the 4t grade of a large metropolitan elementary school represents a random samplin of 8 year old children for that particular school.

__16. If a test is too difficult, the distribution of scores will look something like figure "A".



Statistics for Psychology and Education Dr. G. Lang

Select from column "B" the statistic or statistical term which fits the item listed in column "A".

Insert the number of the correct response in the parentheses in front of the pertinent item listed in column "A".

Column "A"

( ) gives more weight to extreme deviations from the mean

( ) cumulative percentage distribution

( ) a CEEB score of 650

( ) the quickest index of dispersion

( ) the number of standard deviation units a given raw score deviates from the mean of a given group

(X) to be used with a large sample when the relevant measure of variability should be corrected for grouping errors

( ) the index of dispersion when a distribution is truncated at one end

( ) the value of a raw score below which fall a certain percentage of the cases

( ) the most reliable measure of variability

( ) scores from different tests can be placed on a comparable basis

( ) index of dispersion when further computations are likely to be needed, such as the variance

( ) percentage of cases falling below a certain raw score

Column "B"

1. z-score
2. a standard score
3. ordinate
4. range
5. Snedecor's standard devia-
tion correction formula
6. centile point
7. decile
8. normal distribution curve
9. Sheppard's formula
10. standard deviation
11. ogive
12. average deviation
13. centile rank
14. stanine
15. semi-interquartile range

Some Correlational Methods and Their Uses

Dr. Gerhard Lang

Correlational Method	When these methods are used Variable "X"	Variable "Y"	Situation	Measurement Level	Range	Test of significance	Degrees of freedom
Product-moment $r_{xy} = \frac{\Sigma xy}{\sqrt{(\Sigma x^2)(\Sigma y^2)}}$	continuous	continuous	1- linearity 2- symmetry 3-unimodality	Interval	-1.0 to +1.0	if N < 30 use t distribution; if N > 30 use normal prob. table. $z = r\sqrt{N-1}$	N-2 --
Rank-difference $R_{xy} = 1 - \frac{6\Sigma D^2}{N(N^2-1)}$	continuous	continuous	1- scores expressed in ranks or 2- only ranks are available	Ordinal	-1.0 to +1.0	if N < 30 use a special table; if N > 30 use normal prob. table	-- --
Contingency $C = \sqrt{\frac{\chi^2}{N+\chi^2}}$	discrete	discrete	1-only frequencies are available	Nominal	0 to +1.0	χ^2 distribution $\chi^2 = \sum\left[\frac{(f_o-f_e)^2}{f_e}\right]$	$(k-1)(r-1)$
Biserial $r_{bis} = \frac{\bar{X}_p - \bar{X}_q}{s_t} \times \frac{pq}{y}$	continuous	dichotomous	1- dichotomy in "Y" is arbitrary; actual distribution is assumed to be continuous	Interval	unlimited in either direction	transformation to z*	--
Point Biserial $r_{pb} = \frac{\bar{X}_p - \bar{X}_q}{s_t}\sqrt{pq}$	continuous	dichotomous	1-dichotomy in "Y" is distinct	Interval	-1.0 to +1.0	(same as product-moment)	(same as product-moment)
Correlation ratio $\eta = S_x' ; \eta = S_y'$	continuous continuous	continuous or discrete	1- lack of linearity	Interval	0 to +1.0	F distribution	$n_1 = k-1$ $n_2 = N-k$

Product-moment correlation

Definitional formula: $r = \dfrac{\Sigma xy}{\sqrt{\Sigma x^2 \, \Sigma y^2}}$
(# 7.2)

Computational formula (raw scores): $r = \dfrac{N\Sigma XY - \Sigma X \Sigma Y}{\sqrt{[N\Sigma X^2 - (\Sigma X)^2][N\Sigma Y^2 - (\Sigma Y)^2]}}$
(# 7.3)

Computational formula (bivariate frequency distribution):

$$r = \frac{N\Sigma x'y' - (\Sigma fx')(\Sigma fy')}{\sqrt{[N\Sigma fx'^2 - (\Sigma fx')^2][N\Sigma fy'^2 - (\Sigma fy')^2]}}$$

Test Data

Statistics for Psych.
and Education

Student	Test X	Test Y
1	24	29
2	22	40
3	44	36
4	72	32
5	25	46
6	30	47
7	38	49
8	54	53
9	37	51
10	61	50
11	56	45
12	42	48
13	30	25
14	42	48
15	28	28
16	32	40
17	24	37
18	42	58
19	54	54
20	42	44
21	67	48
22	58	48
23	57	33
24	49	47
25	87	52
26	14	48
27	38	46
28	32	33
29	52	40
30	60	49
31	29	49
32	50	55
33	76	43
34	40	38
35	32	56
36	60	45
37	56	67
38	61	42
39	17	44
40	61	48

(A) Plot a scatter diagram, using the following reference points:

	Test X	Test Y
Interval size..................	10	5
Lowest interval.............	10-19	25-29
Origin of coded values: interval	40-49	45-49

(B) Compute the product-moment coefficient of correlation

____

(C) Interpret your finding

Test Data

Student	Test X	Test Y
1	76	63
2	90	85
3	90	90
4	91	63
5	88	87
6	76	59
7	78	58 (60)
8	72	69
9	73	58
10	49	50
11	73	61
12	86	82
13	70	71
14	61	61
15	64	67
16	68	64
17	65	60
18	73	67
19	74	77
20	72	71
21	70	56
22	65	67
23	90	89
24	78	83
25	33	50
26	77	79
27	53	77
28	75	66
29	46	41
30	62	33
31	77	74
32	67	71
33	77	68
34	54	89
35	51	44
36	73	77
37	88	92
38	83	64
39	70	73
40	64	56

Student	Test X	Test Y
41	36	41
42	44	22
43	72	60
44	96	83
45	68	69
46	77	56
47	40	43
48	75	29
49	59	56
50	76	55

(A) Plot a scatter diagram, using the following reference points:

	Test X	Test Y
Interval size	5	10
Lowest interval	30-34	10-19
Origin of coded values; interval	70-74	60-69

(B) Compute the product-moment coefficient of correlation

(C) Interpret your finding

X	Y	Rx	Ry	D=Rx-Ry	D²=Rx-Ry
47	75				
71	79				
58	65				
48	50				
35	49				
35	59				
41	75				
82	91				
72	102				
56	87				
59	70				
73	92				
60	94				
55	75				
41	68				
				Σ	

Statistics for Psychology and Education

X	Y	R_x	R_y	D_{Rx-Ry}	D^2_{Rx-Ry}
27	39				
16	23				
34	12				
21	20				
25	20				
2	6				
15	37				
34	28				
37	46				
30	46				
22	41				
18	5				
40	58				
12	21				
31	26				
11	13				
26	0				
21	21				
23	20				
29	24				
				Σ	

Research Training Institute for Junior College Personnel

Quiz:

I- (36 points) In the space at the left of each item, place a + if you think that the item is TRUE; place a ○ if you think that it is FALSE.

___ 1. If the five lowest scores in a set of scores are increased, the standard deviation of the set will be decreased.

___ 2. A score of 70 in a distribtuion with a mean of 55 and a standard deviation of 10 is better than a score of 100 in a distribution with a mean of 85 and a standard deviation of 8 .

___ 3. There are usually fewer cases between the 20th and the 30th centiles than between the 50th and the 60th centiles of the same distribution.

___ 4. The crude mode is the number of cases in the class interval containing the largest frequency.

___ 5. In any distribution the algebraic sum of the deviations from the mean equals zero.

___ 6. High correlations (above plus .95) indicate that there is a causal relationship between the variables correlated.

___ 7. The value of Chi Square is always the same at the .01 level of significance.

___ 8. The effect of tied scores is to overestimate the value of the Spearman Rho.

___ 9. The equation Y = X - 3 suggests a Pearson r_{xy} which is exactly plus .97 .

___ 10. In Chi Square, the sum of the expected frequencies is usually greater than the sum of the obtained frequencies.

___ 11. Pearson's r_{xy} can only be used when the variables X & Y are expressed in the same score units.

___ 12. A r_{xy} of .80 is about three times as strong as a r_{xy} of .40 in depicting the relationship between the variables X & Y.

___ 13. The assumed mean must be taken at the interval containing the exact mean.

___ 14. One class (No. 10) had a test mean of 36 and another class (No. ~~22~~ 30) has a test mean of 40. Therefore, the test mean for both classes combined would be 38.

___ 15. In computing the median we consider the scores as concentrated at the midpoint of the class intervals.

___ 16. The median score can be obtained by taking half the difference between the lowest and the highest scores and adding it to the lowest score.

Statistics- Dr. Lang

___17. A class of 20 pupils had a median of 52.8; another class of 20 had a median of 72.8. A median for the two classes combined can be obtained from those data.

___18. The height of a given section of a histogram is proportionak to the number of pupils making the score on the corresponding portion of the base line.

___19. The actual distance of a score from the median is not taken into account in computing Q.

___20. The standard deviation can be found without first finding the mean.

___21. A standard deviation laid off on one part of the base line will include the same nuber of cases as a standard deviation laid off on any other section of the base line.

___22. Data representing the nominal level of measurement cannot be treated with any currentl known correlational method.

___23. In a normal distribution, there are just as many points on the scale (or base line) between the 10th centile and the 30th centile~~s~~ as between the 40th and 60th centiles.

___24. The assumption of normality is necessary in the case of Chi Square.

II- (25 points) Briefly identify each of the following statistics. Why and when are they used?

Standard score

Product-moment correlation coefficient

Rank- difference correlation coefficient

Chi Square

Standard error of r_{xy}

III- (9 points) Calculate the appropriate correlation coefficient using data to be announced by your instructor.

Answer: ______________

Y (1.0)

Dr. Gerhard Lang

	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	f_y	y'	fy'	fy'^2	$\Sigma x'$	$y'\Sigma x'$
50-59			($F_{x'y'}$) (F)			${}_{3}1^{2}$	${}_{6}2^{6}$	${}_{3}1^{4}$	4	3	12	36	12	36
40-49					${}_{12}6^{6}$	${}_{6}3^{6}$	${}_{6}3^{9}$	${}_{2}1^{4}$	13	2	26	52	25	50
30-39			${}_{1}1^{-1}$	${}_{4}4^{0}$	${}_{9}9^{9}$	${}_{3}3^{6}$			17	1	17	17	14	14
20-29		${}_{0}3^{-6}$	${}_{0}5^{-5}$	${}_{0}8^{0}$	${}_{0}7^{7}$	${}_{0}1^{2}$			24	0	0	0	-2	0
10-19	${}_{-2}2^{-6}$	${}_{-4}4^{-8}$	${}_{-4}4^{-4}$	${}_{-3}3^{0}$	${}_{-3}3^{3}$				16	-1	-16	16	-15	15
0-9	${}_{-4}2^{-6}$	${}_{-4}2^{-4}$	${}_{-2}1^{-1}$	${}_{-2}1^{0}$					6	-2	-12	24	-11	22
f_x	4	9	11	16	25	8	5	2	80		27	145	23	137
x'	-3	-2	-1	0	1	2	3	4						
fx'	-12	-18	-11	0	25	16	15	8	23					
fx'^2	36	36	11	0	25	32	45	32	217					
$\Sigma y'$	-6	-8	-5	-1	18	12	12	5	27					
[illegible]	18	16	5	0	18	24	36	20	137					

Statistics
Dr. O. Lang

IV-A The administration of Kenny College would like to see the grade distribution in their general education courses approximate the following norm:

Grade "A" = 8%   Grade "D" = 20%
Grade "B" = 26%   Grade "F" = 6%
Grade "C" = 40%

Mr. Marc, an instructor in Education 1015.I gave the following final grades:

Grade "A" = 8 students   Grade "D" = 9 students
Grade "B" = 16 "   Grade "F" = 2 "
Grade "C" = 15 "

Did Mr. Marc's grade distribution depart significantly from that suggested by his college officials?

_________ 1. Calculate Chi Square

_________ 2. How many degrees of freedom are there in this problem?

_________ 3. How large must Chi Square be in order for it to be significant at the .05 level?

_________ 4. Is this Chi Square which you have obtained significant at the .05 level?

_________ 5. What is the probability of getting a Chi Square as large as the one obtained by you?

6. Briefly state the conclusion(s) which can be drawn on the basis of the statistical evidence?

Statistics
Dr. O. Lang

IV-B The purpose of the study was to determine the relative effectiveness of three types of therapy:

"O-F" = Orthodox Freudian Psychoanalysis

"N-C" = Non-directive Counseling

"S-T" = Sullivanian Therapy

"Effectiveness" was operationally defined as therapist's judgment of success or failure.

Twenty subjects were treated by "O-F" , 40 by "N-C", and 60 by "S-T".

Therapy was judged "successful" in the case of 17 clients treated by the "O-F"-method, 27 treated by the "N-C"-approach, and 46 treated by the "S-T"-system.

Is success of the therapeutic process related to type of therapy?

________ 1. Calculate Chi Square

________ 2. How many degrees of freedom are there in this problem?

________ 3. How large must Chi Square be in order for it tb be significant at the .05 level?

________ 4. Is the Chi Square which you have obtained significant at the .05 level?

________ 5. What is the probability of getting a Chi Square as large as the one obtained by you?

6. Briefly state the conclusion(s) which can be drawn on the basis of the statistical evidence.

Dr. Gerhard Lang

Analysis of Variance: One-way Classification

n = number of cases per group
k = number of groups
$N = n_1 + n_2 + \ldots\ldots n_k$
j = specific group

I. Groups of equal size

Total sum of squares:

$$\Sigma\Sigma(X - \bar{\bar{X}})^2 = \Sigma\Sigma X^2 - \frac{(\Sigma\Sigma X)^2}{N}$$

Within sum of squares:

$$\overset{j}{\Sigma}\Sigma(X - \bar{X}_j)^2 = \frac{1}{n}\left[n\Sigma\Sigma X^2 - \overset{j}{\Sigma}(\Sigma X)^2\right]$$

Between sum of squares:

$$n\overset{j}{\Sigma}(\bar{X}_j - \bar{\bar{X}})^2 = \frac{1}{kn}\left[k\overset{j}{\Sigma}(\Sigma X)^2 - (\Sigma\Sigma X)^2\right]$$

Table 1

Scores Made by Subjects in Five Groups

Group

1	2	3	4	5
5	8	9	11	17
5	7	3	12	16
1	4	9	15	18
5	4	10	11	11
8	7	5	10	15
1	7	11	8	9
2	5	9	13	18
2	6	6	13	13
2	8	7	5	12
8	14	6	7	15
4	8	16	11	8
1	5	12	12	13
3	1	11	12	7
4	5	15	9	15
4	8	13	16	15
2	5	4	7	13

Group	1	2	3	4	5	
n	16 +	16 +	16 +	16 +	16	$= N = 80$
ΣX	57 +	102 +	146 +	172 +	215	$= \Sigma\Sigma X = 692$
ΣX^2	279 +	768 +	1,550 +	1,982 +	3,059	$= \overset{j}{\Sigma}\Sigma X^2 = 7,638$
$(\Sigma X)^2$	3,249 +	10,404 +	21,316 +	29,584 +	46,225	$= \overset{j}{\Sigma}(\Sigma X)^2 = 110,778$
$\bar{X}_j$	3.56	6.38	9.12	10.75	13.44	$\bar{\bar{X}} = 8.65$

$$\text{Total SS} = \Sigma\Sigma(X - \bar{\bar{X}})^2 = 7,638 - \frac{(692)^2}{80} = 1632.20$$

$$\text{Within SS} = \overset{j}{\Sigma}\Sigma(X - \bar{X}_j)^2 = \frac{1}{16}\left[16(7,638) - 110,778\right] = 714.38$$

$$\text{Between SS} = n\overset{j}{\Sigma}(\bar{X}_j - \bar{\bar{X}})^2 = \frac{1}{80}\left[5(110,778) - (692)^2\right] = 937.82$$

Total SS = Within SS + Between SS
1632.20 = 714.38 + 937.82

Analysis of Variance for Data of Table 1

Source of Variation	Sum of Squares	d.f.	Variance estimate (Mean Square)	F	P
Between	937.82	4	$234.46 = s^2_b$	24.60	<.001
Within	714.38	75	$9.53 = s^2_w$		
Total	1632.20	79			

Comparison of two means following an F-test

$$t = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\frac{s^2_w}{n_1} + \frac{s^2_w}{n_2}}} = \frac{6.38 - 3.56}{\sqrt{\frac{9.53}{16} + \frac{9.53}{16}}} = 2.59$$

d.f. = 75 $p < .02$

II. Groups of unequal size

Total sum of squares:

$$\sum\sum(X-\bar{X})^2 = \sum\sum X^2 - \frac{(\sum\sum X)^2}{N}$$

Within sum of squares:

$$\sum^{j}\sum(X-\bar{X}_j)^2 = \sum\sum X^2 - \sum^{j}\frac{(\sum X)^2}{n_j}$$

Between sum of squares:

$$\sum^{j} n_j(\bar{X}_j-\bar{X})^2 = \sum^{j}\frac{(\sum X)^2}{n_j} - \frac{(\sum\sum X)^2}{N}$$

Table 2

Scores Made by Subjects in Four Groups

Group

1	2	3	4
5	9	8	1
7	11	6	3
6	8	9	4
3	7	5	5
9	7	7	1
7		4	4
4		4	
2			

$$n \quad 8 + 5 + 7 + 6 = N = 26$$

$$\sum X \quad 43 + 42 + 43 + 18 = \sum\sum X = 146$$

$$\sum X^2 \quad 269 + 364 + 287 + 68 = \sum\sum X^2 = 988$$

$$\frac{(\sum X)^2}{n_j} \quad 231.13 + 352.80 + 264.14 + 54.00 = \sum^{j}\frac{(\sum X)^2}{n_j} = 902.07$$

$$\bar{X}_j \quad 5.38 \qquad 8.40 \qquad 6.16 \qquad 3.00$$

$$\text{Total SS} = \sum\sum(X-\bar{X})^2 = 988 - \frac{(146)^2}{26} = 168.15$$

$$\text{Within SS} = \sum^{j}\sum(X-\bar{X}_j)^2 = 988 - 902.07 = 85.93$$

$$\text{Between SS} = \sum^{j} n_j(\bar{X}_j-\bar{X})^2 = 902.07 - \frac{(146)^2}{26} = 82.22$$

$$\begin{array}{ccccc} \text{Total SS} & = & \text{Within SS} & + & \text{Between SS} \\ 168.15 & = & 85.93 & + & 82.22 \end{array}$$

Analysis of Variance for Data of Table 2

Source of Variation	Sum of Squares	d.f.	Variance Estimate (Mean Square)	F	P
Between	82.22	3	$27.41 = s^2_b$	7.01	$<.01$
Within	85.93	22	$3.91 = s^2_w$		
Total	168.15	25			

Comparison of two means following an F-test

$$t = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\frac{s^2_w}{n_1} + \frac{s^2_w}{n_2}}} = \frac{5.38 - 8.40}{\sqrt{\frac{3.91}{8} + \frac{3.91}{5}}} = 2.68$$

$d.f. = 22 \quad P < .02$

The PERT Project
School of Education
The Ohio State University
41 West 11th Avenue
Columbus, Ohio 43210

PERT Dissemination Lecture Survey

Directions: Unless indicated otherwise, respond to each item by marking an "X" in the space before the appropriate response. Note that some items ask for more than one response. If additional explanatory material is necessary, please write in the margin by the item for which the material is relevant.

1. What is your highest earned degree?

   ___1 No degree
   ___2 Bachelor's
   ___3 Master's
   ___4 Doctorate

2. Please provide the following information concerning your position at the time you attended the lectures (March-April 1965)

   ____
   Your title

   ____
   Branch, Department, or Division

   ____
   Institution or agency

   ____
   City and State

3. What was the general type of institution or agency with which you were connected at the time of attending the PERT lectures?

   ___1 College or university
   ___2 Private Foundation
   ___3 Governmental agency (federal)
   ___4 Governmental agency (state)
   ___5 Private or public school system
   ___6 Business or industry
   ___7 Military
   ___8 Other (list)______________________________

4. What was the principal function of the unit to which you were attached?

   ___1 Administration
   ___2 Research
   ___3 Teaching
   ___4 Service

(Continued on Page 2)

5. Describe the type of responsibility you had for the planning and execution of research projects (funded or non-funded) at the time of attending the lectures.

___1 No personal administrative responsibility for a research project
___2 Personal responsibility for one or more projects for which I am the principal investigator
___3 Administrative responsibility for an office directing one or more research projects
___4 Responsibility for the management of a project under the direction of a principal investigator
___5 Other (Specify)____

6. Indicate the type(s) for which you had responsibility according to you response to Item 5: (check more than one if needed)

___1 Non-funded project
___2 Locally funded project
___3 State funded project
___4 Federally funded project
___5 Other (Specify)____

7. How did you become aware of the PERT dissemination lecture series?

___1 Announcement distributed at 1965 AERA meeting
___2 Announcement in local news media (newspaper, radio, etc.)
___3 Announcement in professional journals or newsletters (Phi Delta Kappan, American Psychologist, etc.)
___4 Conversation or note from colleague
___5 Other (Specify)____

8. Please indicate the conditions under which you attended the PERT lectures:

___1 Designated representative of an agency of institution
___2 Volunteer attendee because of personal interest
___3 Other (Specify)____

9. Describe your attendance at the dissemination lectures:

___1 Attended only first day
___2 Attended only the second day
___3 Attended both days
___4 Attended only parts of any one day

10. Were you acquainted with PERT prior to attending the dissemination lectures?

___1 Yes
___2 No

IF YOU ANSWERED YES TO ITEM 10, RESPOND TO ITEMS 11 THRU 15. IF NO, CONTINUE ON AT ITEM 16.

11. How would you describe your knowledge about PERT?

___1 Little knowledge
___2 Some knowledge
___3 Much knowledge

(Continued on Page 3)

12. How would you describe your experience with PERT?

___1 No practical experience
___2 Little practical experience
___3 Some practical experience
___4 Much practical experience

13. How would you describe the lectures with regard to coverage and explanation of basic PERT concepts and principles?

___1 Basic concepts were not adequately covered nor explained
___2 Basic concepts were adequately covered but not sufficiently explained
___3 Adequately covered and explained
___4 Not able to judge

14. How would you describe the accuracy and up-to-dateness of the material presented in the lecture?

___1 Both accurate and up-to-date
___2 Some inaccuracies but up-to-date
___3 Accurate but not up-to-date
___4 Neither accurate nor up-to-date
___5 Not able to judge

15. Did you feel that ideas and content of the lectures were of sufficient quality that you would utilize them in presenting a PERT orientation lecture to your own agency or staff?

___1 Yes
___2 No
___3 Not able to judge

16. Describe any plans you had for using the information presented at the lectures (check more than one if necessary):

___1 For use in planning project proposal
___2 As a management system for a specific on-going project
___3 To enable me to control several on-going projects under my responsibility
___4 To conduct instruction
___5 I had no immediate plans for using it since I was just curious to learn about PERT
___6 Other (Specify)____

17. Did you actually use PERT on a new or on-going project?

___1 Yes
___2 No

18. If your answer to Item 17 was Yes, describe briefly the nature of the project(s) on which you implemented the technique (e.g., curriculum development projects, experimental research project, school survey project, etc.).

____

____

(Continued on Page 4)

19. Describe the degree of implementation for the project identified on Item 18. If None, go on to Item 20. (Check only highest level of implementation).

___1 Developed only a network
___2 Developed a network and secured time estimates
___3 Developed a network, secured time estimates, and established a schedule for control purposes
___4 Accomplished actions described in response 3 plus conducting one or more up-dates of the project
___5 Other (Specify)______________________________

20. If you did not or have not utilized or implemented PERT, please indicate your reason (check more than one if necessary).

___1 It is not suitable for my type of work
___2 It is too complicated
___3 It was not what I thought it was going to be
___4 Insufficient knowledge about the technique
___5 Involves too much initial effort and time
___6 Lack of a computer to process data
___7 Other (Specify)______________________________

21. If you made any presentation of an instructional nature based upon information secured from attending the dissemination lectures, indicate the nature of the audience(s) and the approximate size of the group(s).

Group	Size
___1 Students	________
___2 Fellow staff members	________
___3 Research project personnel	________
___4 Other (Specify)________________	________

22. If the lecture was your first introduction to PERT, were you motivated to attend any other presentatinns, seminars, or courses on PERT as a consequence of attending the dissemination lectures?

___1 Yes
___2 No

23. If Yes to Item 22, identify below any presentation(s) you did attend. If None, so indicate.

____

____

24. Have you employed or utilized PERT consultants in your activities since attending the dissemination lectures?

___1 Yes
___2 I wanted to but couldn't locate one
___3 No

(Continued on Page 5)

25. List below any offices or agencies you can remember contacting for further information about PERT. If None, so indicate.

Agency	Location
______________________________	______________________________
______________________________	______________________________
______________________________	______________________________

26. Listed below are several possible procedures for presenting information on a new technique, such as PERT, to the educational community. Rank from 1 to 8 items listed in terms of how you would rate their effectiveness as an initial means of dissemination.

___1 Dissemination lectures
___2 Instructional film
___3 Monograph or book
___4 Article(s) in professional journal(s)
___5 Presentation(s) at national professional meeting(s)
___6 College level course(s)
___7 Workshop(s)
___8 Other (Specify)____

27. The U. S. Office of Education is planning to publish a monograph on PERT applications in education. Under what conditions would you attempt to secure such a monograph?

___1 I would read it if the monograph was sent to me gratis
___2 I would write for a copy if available free
___3 I would buy a copy if it had to be purchased
___4 I would not buy a copy if it had to be purchased
___5 Other (Specify)____

IF YOU HAVE MADE ANY APPLICATION OF PERT TO EDUCATIONAL PROJECTS AND HAVE AVAILABLE NETWORKS, COMPUTER REPORTS, AND SIMILAR MATERIALS, WE WOULD APPRECIATE RECEIVING SUCH INFORMATION FOR OUR FILES. PLEASE SEND TO THE ADDRESS AT THE TOP OF THE FIRST PAGE.

Be sure you have responded to all items as required

Thank you for your cooperation.

APPENDIX K

Program Publicity and Course Certificate

THE NEW YORK TIMES, MONDAY, JUNE 6, 1966.

3 COLLEGES IN STATE GET FEDERAL GRANTS

Special to The New York Times

WASHINGTON, June 5—The New York State Education Department and three colleges in the state have been awarded grants totaling $426,000 to train education researchers, the United States Office of Education announced today.

The Rockland Community College, Columbia University and Cornell University were the schools named. The funds will enable them to train a total of 38 education researchers.

The State Education Department will receive $325,000 for training 50 students on the graduate level and for program development.

Rockland College will receive $23,721 to train 25 students in institutes or special-training projects. Participants can receive payments of up to $75 a week.

Nine students at the graduate level are to be trained at Columbia through a grant of $54,000.

Cornell will receive $24,000 for training four students at the graduate level. The graduate-training program is for a maximum of three years. Students enrolled in programs leading to master's and doctor's degrees may receive up to $2,800 for the academic year.

David J. Fox, City College of the City University of New York, has authored *Fundamentals of Research in Nursing* (New York, Appleton Century Crofts), a basic research text intended for the consumer of research in the health fields. He has also received a grant from the U.S. Office of Education to study the interaction of fifth and second grade children in an elementary school "Peace Corps" in which achieving fifth graders are assigned to a low achieving second grade class (the underdeveloped nation). The children meet regularly in social and play situations during the school year. The project will evaluate changes in the
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Irvin Hochman, Associate Professor of Psychology, Rockland Community College, State University of New York, is Program Director of a "Research Training Institute for Junior College Personnel" supported through a research training grant from the United States Office of Education, Bureau of Research. The Institute is being held at the College from July 11 to August 19, 1966 for teaching and administrative staff of public and private institutions. **Gerhard Lang**, Research Associate, Board of Examiners, N.Y.C. Board of Education, is Principal Instructor and Consultant.

John Holland, American College Testing Program, is the author of *The Psychology of Vocational Choice: A Theory of Personality Types and Environmental Models* published recently by Blaisdell-Ginn.

Fred N. Kerlinger has been appointed director of a new doctoral program of the School of Education, New York University. It is called "Research in Educational Psychology: Design, Measurement, Statistics."

Henry Clay Lindgren, San Francisco State College, is co-author (with Donn Byrne and Lewis Petrinovich) of *Psychology: An Introduction to a Behavioral Science*, which was published by John Wiley and Sons early in 1966.

James F. Magary has returned to the University of Southern California as an associate professor in the Division of Educational Psychology, Exceptional Children and Counselor Education, after several years leave on the East Coast. With 27 collaborators, he has edited and written a handbook entitled *School Psychological Services: In Theory and Practice*, to be published by Prentice-Hall in November, 1966.

Frances A. Mullen, consulting psychologist, Chicago, has resigned from her position as Assistant Superintendent of the Chicago public schools to devote full time to work as a consultant in special education of the handicapped.

Murray Lincoln Murray, Illinois State University, has been spending his sabbatic leave, with his wife Margaret, visiting clinics abroad which treat learning disorders. His itinerary has included Glasgow, London, Amster-
rlin, Vienna, Istanbul, Athens, Rome, Barcelona,
d Paris. He has collected documentary films
rdings.

l. Noll is retiring as Professor of Education at Michigan State University on July 1, 1966.
me day he leaves for Bangkok, Thailand for
eeks stint as consultant on testing programs.
to return to East Lansing about September
tober 1 he begins work with Bob Ebel as
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acher education at Michigan State on which
working this year. The prospects seem to
irement will be a busy and enjoyable

Connecticut, has received
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as a pilot study of the possibil-
ng essays by computer. Dr. Page has been named director of a USOE doctoral research-training program, to develop educational researchers with computer competence, particularly in natural-language analysis (e.g., for essays, information storage and retrieval, etc.). Next year he will be part-time Visiting Scientist to the M.I.T. Computation Center, under a grant made by the Center and by IBM Corporation. He is on the Editorial Board for the new journal, *Computer Studies in Verbal Behavior and the Humanities*, to be published by the Mouton Press.

Harry J. Parker, Ph.D., University of Oklahoma, has been promoted to Professor of Education. He has also been appointed Research Professor of Preventive Medicine and Public Health in the University of Oklahoma Medical Center. This appointment calls for half-time teaching, research and service in rehabilitation medicine.

William Watson Purkey, University of Florida, has received a USOE grant for research on "Independent Study for Gifted Underachievers." Dr. Purkey would welcome communications from investigators in related fields.

L. Leon Reid, formerly of the University of Pittsburgh, has taken a position as Director, Greater Pittsburgh Guild for the Blind, 5231 Centre Avenue, Pittsburgh. Dr. Reid does, however, maintain status as Adjunct Professor in the School of Education at the University of Pittsburgh. His new program is concerned not so much with vocational training as with "helping the blind person to adjust to blindness."

Joseph M. Scandura, Florida State University, accepted a position as Associate Professor of Mathematics Education in the Graduate School of Education, University of Pennsylvania. One of his major responsibilities will

THE ROCKLAND COUNTY JOURNAL-NEWS, MONDAY, JUNE 20, 1966

Please Pick a Prof, County College Asks

Housing is urgently needed for approximately 20 college professors and administrators from public and private junior colleges who will attend a six-week research training institute for junior college personnel July 11 to Aug. 19, at Rockland Community College.

Supported through a research grant from the U.S. Office of Education Bureau of Research, the program will be directed by Dr. Irvin Hochman, associate professor of psychology at the College.

The principal instructor and consultant will be Dr. Gerhard Lang, research associate of the Board of Examiners for the New York City Board of Education.

The participants, representing over 15 academic fields, will receive intensive training in educational research methodology and statistical techniques. Each participant will be required to develop in detail at least one substantial research proposal. Nationally prominent guests lecturers have accepted invitations to address the group.

Persons interested in renting furnished rooms or apartments should contact Dr. Hochman at the college or at his home, 120 Summit Ave., Dumont, N.J.

RESEARCH TRAINING INSTITUTE FOR JUNIOR COLLEGE PERSONNEL

ROCKLAND COMMUNITY COLLEGE
SUFFERN, NEW YORK

THIS IS TO CERTIFY THAT

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HAS ATTENDED THIS INSTITUTE WHICH WAS SUPPORTED THROUGH A RESEARCH TRAINING GRANT FROM THE UNITED STATES OFFICE OF EDUCATION, BUREAU OF RESEARCH AND HELD ON THE CAMPUS OF THE ROCKLAND COMMUNITY COLLEGE, STATE UNIVERSITY OF NEW YORK.

July 11 - August 19, 1966

IRVIN HOCHMAN, Ph.D.
PROGRAM DIRECTOR

GERHARD LANG, Ph.D.
PRINCIPAL INSTRUCTOR
AND CONSULTANT